SL-200ME
RMT-226

SERVICE MANUAL

ME Model

September, 1985

711B2 CHASSIS

This manual contains the adjustment method and SUPPLEMENT-1.

SPECIFICATIONS

System

Video recording system	Rotary two-head helical scanning
Video signal	CCIR standards, PAL and SECAM colour
Aerial input	75-ohm, asymmetrical aerial socket
Channel coverage	VHF: Western European channels E2 - E12 UHF: Western European channels E21 - E68 (Up to 8 programmes can be preset.)
RF output signal	UHF channels E30 to E39 (variable) 75 ohms, unbalanced

Video

Input	VIDEO IN: BNC connector 1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p) 75 ohms, unbalanced, sync negative
Output	VIDEO OUT: BNC connector 1.0 V (p-p) ±0.1 V (p-p) 75 ohms, unbalanced, sync negative

Audio

Input	AUDIO IN: phono jack 47 kilohms, −10 dBs (0 dBs = 0.775 V rms)
Output	AUDIO OUT: phono jack Load impedance less than 10 kilohms −10 dBs with 47 kilohms load, unbalanced

Tape transport

Tape speed	18.73 mm/sec.
Maximum recording time	2 hours 10 min. (with Sony L-500 cassette) 3 hours 15 min. (with L-750)
Fast forward/rewind time	Within 5 min. (with L-500)

Timer

Clock	Crystal lock
Time indication	24-hour cycle
Timer setting	Only for recording 1 event/week, adjustable for any day or for all 7 days of the week

– Continued on next page –

Beta

VIDEO CASSETTE RECORDER

SONY®

MICROFILM

General

Power requirements	110 - 127 V or 220 - 240 V ac ± 10 % adjustable, 50/60 Hz
Power consumption	35 W
Storage temperature	-20° C to + 60° C (-4° F to + 140° F)
Operating temperature	5° C to 40° C (41° F to 104° F)
Dimensions	Approx. 430 × 108 × 384 mm (w/h/d) (17 × $4^{3}/_{8}$ × $15^{1}/_{8}$ inches) including projecting parts and controls
Weight	Approx. 7.5 kg (16 lbs 9 oz) net

Accessories supplied

75-ohm coaxial cable for recorder to TV connection (1)
Remote Commander RMT-226 with two IEC designation R6 batteries (1)
Dust cover (1)
Screwdriver (for RF channel adjustment and TV station presetting) (1)

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

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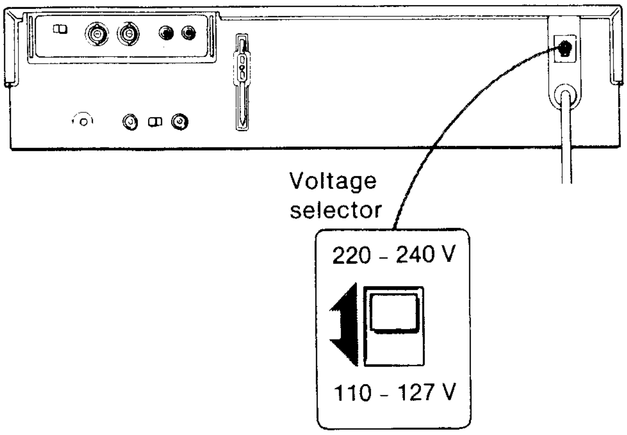
SECTION 1
GENERAL

OPERATING VOLTAGE

This unit operates on either 110 - 127 V ac or 220 - 240 V ac.
Before operating the unit to the power source, set the voltage selector at the rear to the appropriate position according to your local power supply.



1-1. PRECAUTIONS

On safety

- Before operating the unit, make sure that the operating voltage of your unit is identical with that of your local power supply.
- Should any solid object or liquid fall into the cabinet, turn off the unit and have it checked by qualified personnel before operating it any further.
- To disconnect the mains lead (ac power cord), pull it out by the plug. Never pull the lead itself.
- The unit is not disconnected from the mains (ac power source) as long as it is connected to the mains outlet, even if the unit itself has been turned off.

On installation

- Allow adequate air circulation to prevent internal heat build-up. Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation grille.
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Do not install it in an inclined position.
- Keep the unit and cassette tapes away from equipment with strong magnets, such as a microwave oven, large loudspeakers, etc.

On operation

- When the unit is not to be used for a long period, turn the unit off to conserve energy and to extend the useful life of your unit.
- Remove and store video cassettes after recording or playback. Always store the cassette in its case to keep the tape away from dust.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth. Do not use a moistened cloth or any type of solvent, such as alcohol or benzine, which might damage the finish.

On repacking

Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

On colour broadcasting systems

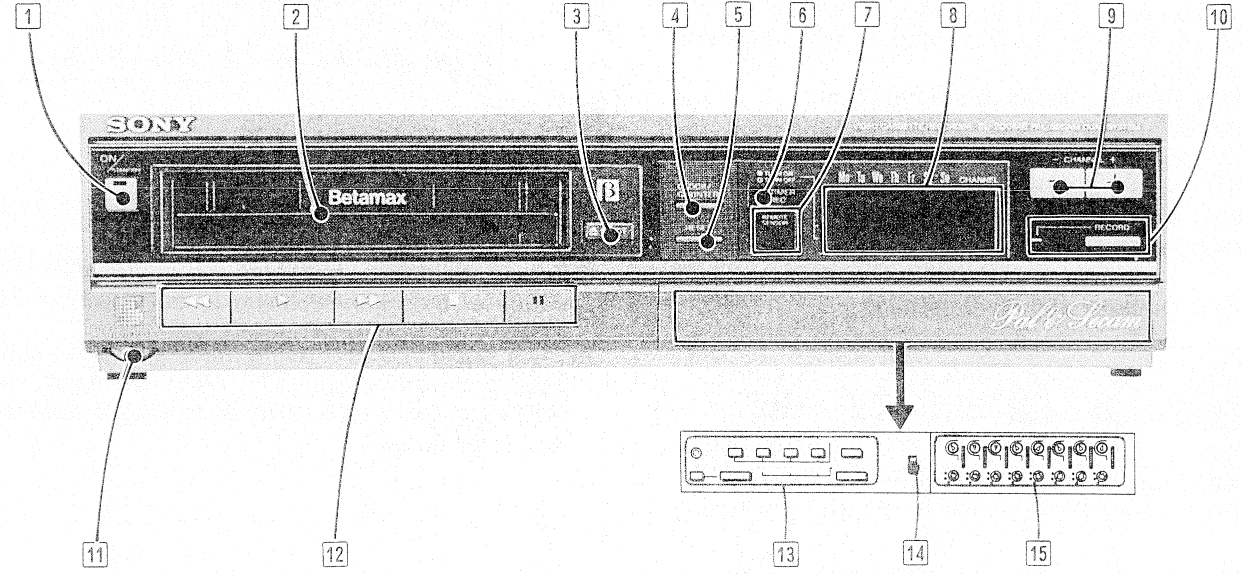
This unit is designed to receive, record and play back programmes based on the PAL and SECAM colour systems.

- Tapes recorded with the French SECAM colour system can be played back on this unit but it is not possible to receive French TV broadcasts with this unit.

If you have any questions about this unit, contact your Sony dealer.

1-2. LOCATION AND FUNCTION OF CONTROLS

Front



1 ON/STANDBY switch and indicator
Press to turn on the unit. The indicator will light up. Press again to turn it off.
The timer section will continue to operate and the time will be displayed even if the ON/STANDBY switch is off.

2 Cassette compartment
Insert a cassette after turning on the recorder.

3 ⏏ EJECT button
Press to remove the cassette. This button does not function when the recorder is turned off.

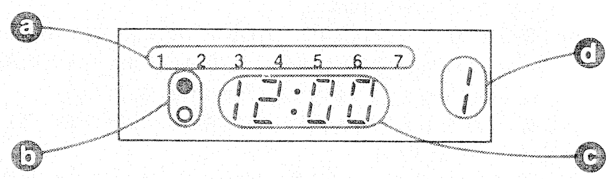
4 CLOCK/COUNTER button
Press to set the display to the tape counter. To reset to clock, press it again.

5 RESET button
Press to set the tape counter reading to "0000" when the tape counter is displayed.

6 TIMER REC indicator
Lights when the TIMER REC ON/OFF button is pressed to set the recorder in timer recording standby mode. It remains lit until the timer recording is finished.

7 REMOTE SENSOR
Detects the remote control signal transmitted from the supplied Remote Commander.

8 Display window



ⓐ **Day of the week indications**
ⓑ **Turn-on and turn-off setting indications:** The "●" mark shows the display is the turn-on time of the timer recording and the "O" mark shows the turn-off time.
ⓒ **Time and counter display:** Usually shows the present time. When the CLOCK/COUNTER button is pressed, the display shows the counter number.
ⓓ **Channel number:** Shows the channel number selected with the + and − CHANNEL buttons.

9 CHANNEL +/− buttons
Press + to advance or − to reverse the channel numbers.

10 RECORD button and indicator
Press to start recording. The indicator will light.

11 TRACKING control
If streaks or snow appear during the playback of a tape recorded on another recorder, turn this knob to obtain the best possible picture.

12 Function buttons

◀◀ **REW button**: Press to rewind the tape. Also used for the reverse picture search, skip scan and auto play operation.

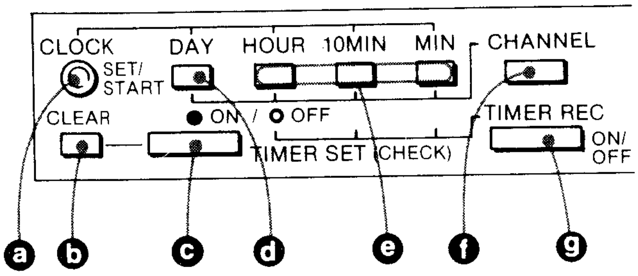
▶ **PLAY button**: Press to play the tape back. Also used for auto play operation.

▶▶ **FF button**: Press to advance the tape rapidly. Also used for the forward picture search and skip scan operation.

■ **STOP button**: Press to stop the tape.

❚❚ **PAUSE button**: Press to stop the tape for a moment during recording or playback. A still picture will be seen during playback. Press again to release the pause mode. The indicator on the button lights during pause.

13 Buttons for clock and timer settings



ⓐ **CLOCK button**: Press to initiate clock setting.

ⓑ **CLEAR button**: Press to clear the timer programme memorized.

ⓒ **TIMER SET (CHECK) button**: Press to initiate timer setting. This button is also used for checking, erasing or changing the timer setting.

ⓓ **DAY button**: Press to set the turn-on day of a timer recording.

ⓔ **HOUR, 10 MIN an MIN buttons**: Press to set the turn-on/off time of a timer recording.

ⓕ **CHANNEL button**: Press to select the TV channel to be recorded by the timer.

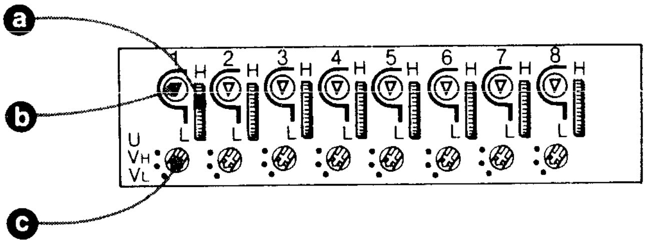
ⓖ **TIMER REC ON/OFF button**: Press to set the recorder to timer recording stand-by mode. Press it again to deactivate timer recording.

14 AFT (Automatic Fine Tuning) switch

Normally set to ON. The automatic fine tuning circuit locks in the signal and maintains a sharp picture.

15 Tuning section

Used to preset up to 8 TV stations.

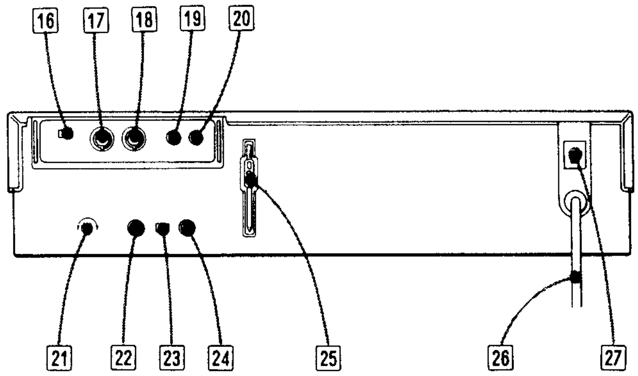


ⓐ **Tuning knob**: Turn until the desired station is properly tuned in.

ⓑ **Tuning indicator**: Indicates the approximate location of the channel being tuned in within the band.

ⓒ **Band select switch**: Using the ⊕ end of the supplied screwdriver, set to V_L (VHF low band), V_H (VHF high band) or U (UHF) according to the station to be tuned in.

Rear



16 TEST SIGNAL switch
Set to ON to obtain the test pattern for adjusting the TV so that it can receive the signal from the recorder.

17 VIDEO OUT jack (BNC type)
Connect to the video input of another video cassette recorder or a video monitor.

18 VIDEO IN jack (BNC type)
Connect to the video output of a camera, another video cassette recorder, etc.

19 AUDIO OUT jack (phono type)
Connect to the audio input of a video monitor or video cassette recorder.

20 AUDIO IN jack (phono type)
Connect to the audio output of a camera or another video cassette recorder.

21 RF CHANNEL screw
If there is interference on the factory-preset channel for RF output and the signal of this recorder cannot be displayed clearly on the TV screen, adjust this screw using the ⊖ end of the supplied screwdriver.

22 AERIAL OUT socket
Connect the aerial input of the TV receiver using the supplied cable.

23 DX/LOCAL switch
Normally set this switoh to DX. If the TV signal is very strong, set the switch to LOCAL using the ⊖ end of the supplied screwdriver.

24 AERIAL IN socket
Connect the aerial cable.

25 Screwdriver holder
Keep the supplied screwdriver here when not in use.

26 AC mains lead

27 Voltage selector
Set to 110 - 127 V or 220 - 240 V according to your local power line voltage.

1-3. TIMER-ACTIVATED RECORDING

Using the built-in timer, you can make one recording any day or every day, within 7 days.

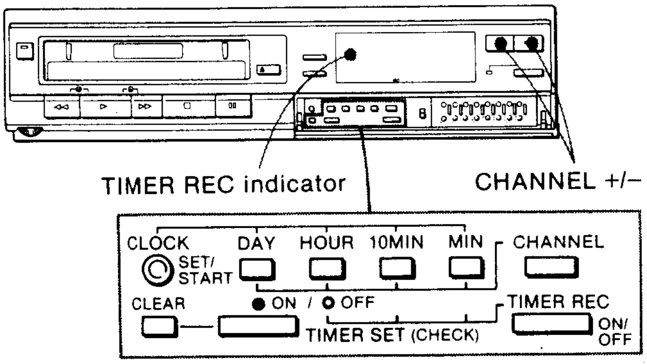
Check before setting the timer

- Is the clock set to the correct day and correct time? Timer setting can only be made after the clock has been set.
- Is a cassette inserted in the recorder?
- Is the cassette long enough to record the programmes?
- Does the cassette have a safety tab on the bottom?

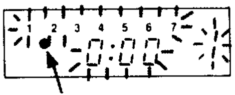
Note : The timer cannot be set during recording or playback.

TO SET THE TIMER

Example : To record channel 2 broadcast from 9 : 00 AM to 11 : 25 AM on Friday.

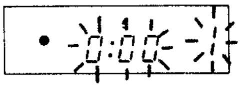


1 Press the TIMER SET (CHECK) button.
(If the recorder is off, it will be turned on automatically.)

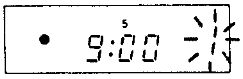


Turn-on indication

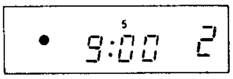
2 Set the turn-on day by pressing the DAY button.
Day indication changes :
1234567(every day)→1→2→...7



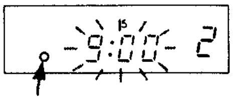
3 Set the turn-on time by pressing the HOUR, 10 MIN and MIN buttons.



4 Select the channel to be recorded by pressing the CHANNEL button.

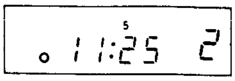


5 Press the TIMER SET (CHECK) button.

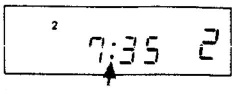


Turn-off indication

6 Set the turn-off time by pressing the HOUR, 10 MIN and MIN buttons.



7 Press the TIMER REC ON/OFF button.



Current day and time

The TIMER REC indicator lights and the recorder is turned off.

At the preset turn-on time, recording will start automatically and will stop at the preset turn-off time.

Note
If the inserted cassette is at its end or does not have the safety tab, the cassette will be automatically ejected when the TIMER REC ON/OFF button is pressed.

ONCE THE TIMER REC INDICATOR HAS LIT UP, NO FUNCTION OF THE RECORDER CAN BE ACTIVATED, except for checking the timer setting.
To operate the recorder after setting the timer for recording, press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off. To reactivate the timer recording standby mode, be sure to press the TIMER REC ON/OFF button again.

WHILE SETTING TIMER

To change the preset item
Press the CLEAR button and repeat the timer setting procedure from step 2.

To record to the end of the tape
Set the turn-off time to a time after the tape will reach its end.

BEFORE OR DURING TIMER RECORDING

To check the timer setting
Press the TIMER SET (CHECK) button. Each time the TIMER SET (CHECK) button is pressed, the display will change to the preset turn-on time, the turn-off time, then the current time.
During actual timer recording, only the turn-off time can be checked.

To change the settings

1 Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off.
2 Press the TIMER SET (CHECK) button.
3 Press the CLEAR button.
4 Repeat the timer setting procedure from step 2.

To erase the timer setting

1 Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off.
2 Press the TIMER SET (CHECK) button.
3 Press the CLEAR button.
The setting will be erased from the memory.

Note: When the TIMER REC indicator is lit, the timer setting cannot be erased.

If the tape reaches the end during timer recording
The recording will stop and the tape will be rewound to the beginning. Then after about a second, the recorder will be turned off.

To stop the on-going timer recording
Press the TIMER REC ON/OFF button so that the TIMER REC indicator goes off. The unit will be turned off automatically after about a second.

When a power interruption occurs
If the clock shows "0:00" and the dots blink, all the timer settings have been erased. Reset the clock time and the timer setting.

AFTER TIMER RECORDING

When a timer recording is finished, the setting (except the everyday setting) will be deleted automatically.

1-4. CLOCK SETTING

When you connect the mains lead to a mains outlet, the clock indicates "0 : 00" with the two dots blinking.

Example: To set the clock to 7 : 35 p.m. (19 : 35) on Tuesday

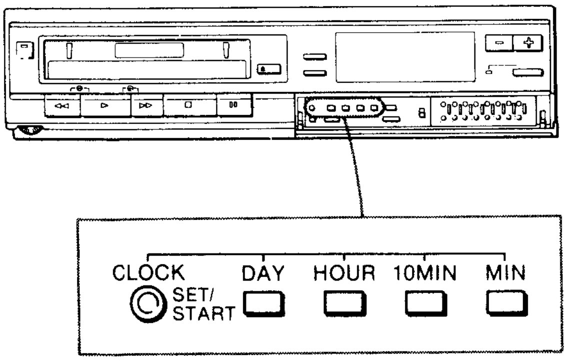
Time indication

AM			
12 : 00 (midnight)	1 : 00		11 : 00
0:00	1:00		11:00

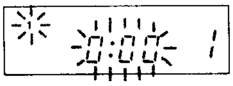
PM					
12 : 00 (noon)	1 : 00	2 : 00		10 : 00	11 : 00
12:00	13:00	14:00		22:00	23:00

Day indication

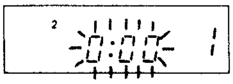
Mo (Monday)	Tu (Tuesday)	We (Wednes-day)	Th (Thursday)	Fr (Friday)	Sa (Saturday)	Su (Sunday)
1	2	3	4	5	6	7



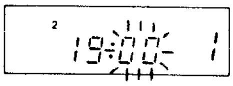
1 Press the CLOCK button.



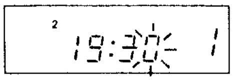
2 Set the day by pressing the DAY button.



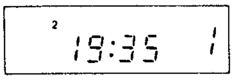
3 Set the hour by pressing the HOUR button.



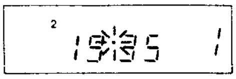
4 Set the tens-digit of the minute by pressing the 10 MIN button.



5 Set the units-digit of the minute by pressing the MIN button.



6 With the time signal, **press and immediately release the CLOCK button.**
The clock now starts operating. The dots of the colon alternately blink every 30 seconds.



Note
If you press the CLOCK button for more than a second, "0 : 00" blinks to show that the clock adjustment is required again.

Zero second adjustment
If the CLOCK button is pressed when the upper dot of the colon is blinking, the clock is set to the time displayed 00 second. For example, if the clock time is 7 : 30, 20 seconds, it is set to 7 : 30, 00 second.
If the CLOCK button is pressed when the lower dot is blinking, the clock advances one minute and is set to the time displayed 00 second. For example, if the clock time is 7 : 30, 40 seconds, it is set to 7 : 31, 00 second.

To change the actual clock setting
Press the CLOCK button and repeat the clock setting procedure from step 1.

When power has been interrupted, the time indication reverts to "0 : 00", showing that the clock must be reset.

The DAY, HOUR, 10 MIN and MIN buttons can be pressed in two ways.

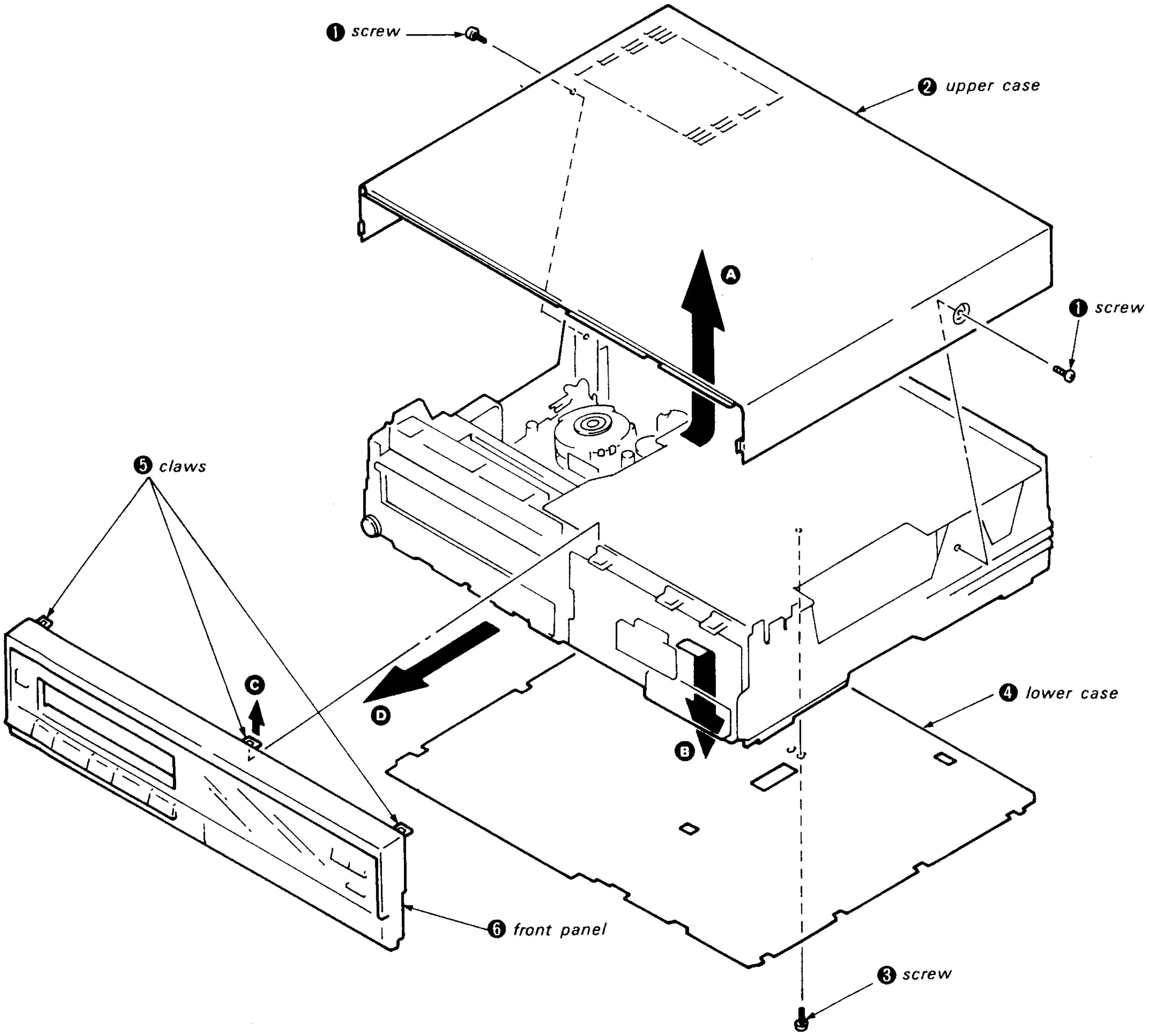
When you hold a button down, the digits will advance continuously until the button is released.

When you press and immediately release a button, the digits will advance by one.

SECTION 2
DISASSEMBLY

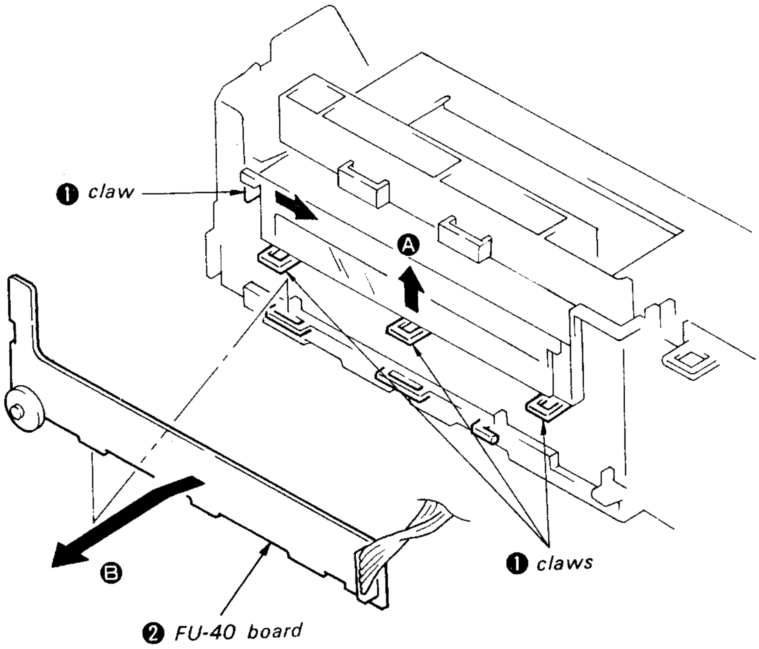
2-1. DISASSEMBLY OF CABINET

1) Remove the two case screws ❶.
2) Remove the upper case ❷ in the direction shown by the arrow Ⓐ.
3) Loosen the screw ❸.
4) Remove the lower case ❹ in the direction shown by the arrow Ⓑ.
5) Remove the three claws ❺ of the front panel in the direction shown by the arrow Ⓒ.
6) Remove the front panel ❻ in the direction shown by the arrow Ⓓ.


❶ screw
❷ upper case
Ⓐ
❶ screw
❺ claws
Ⓒ
Ⓓ
Ⓑ
❹ lower case
❻ front panel
❸ screw

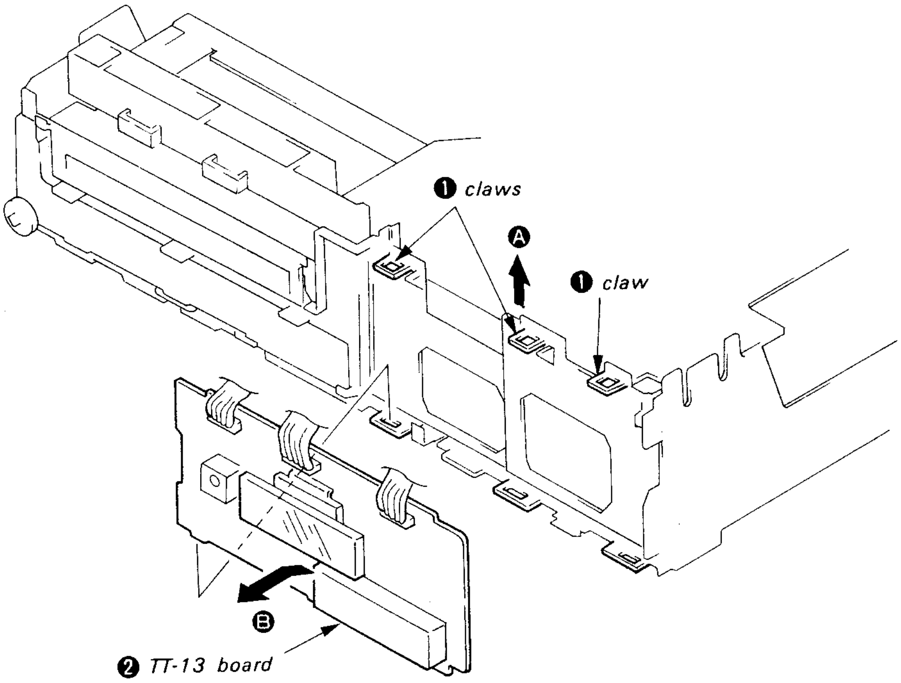
2-2. REMOVAL OF THE FU-40 BOARD

1) Remove the four claws ❶ in the direction shown by the arrow Ⓐ .
2) Remove the FU-40 board ❷ in the direction shown by the arrow Ⓑ .


❶ claw
Ⓐ
Ⓑ
❶ claws
❷ FU-40 board

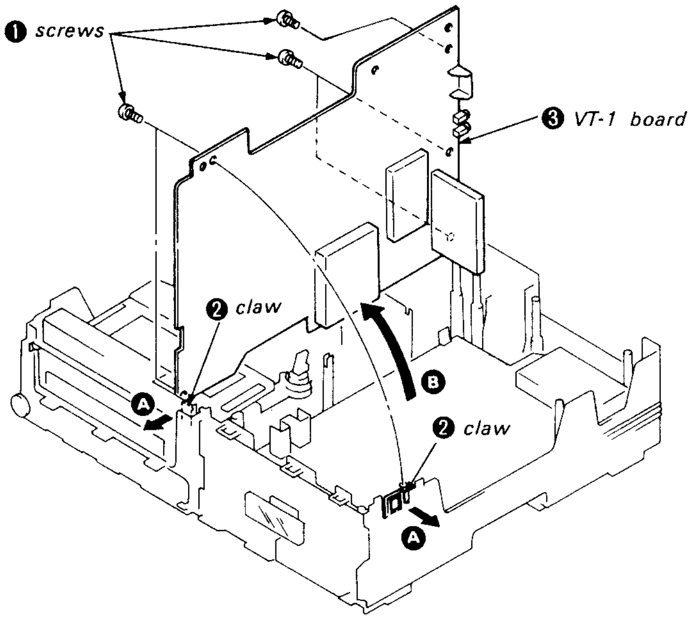
2-3. REMOVAL OF THE TT-13 BOARD

1) Remove the three claws ❶ in the direction shown by the arrow Ⓐ .
2) Remove the TT-13 board ❷ in the direction shown by the arrow Ⓑ .


❶ claws
Ⓐ
❶ claw
Ⓑ
❷ TT-13 board

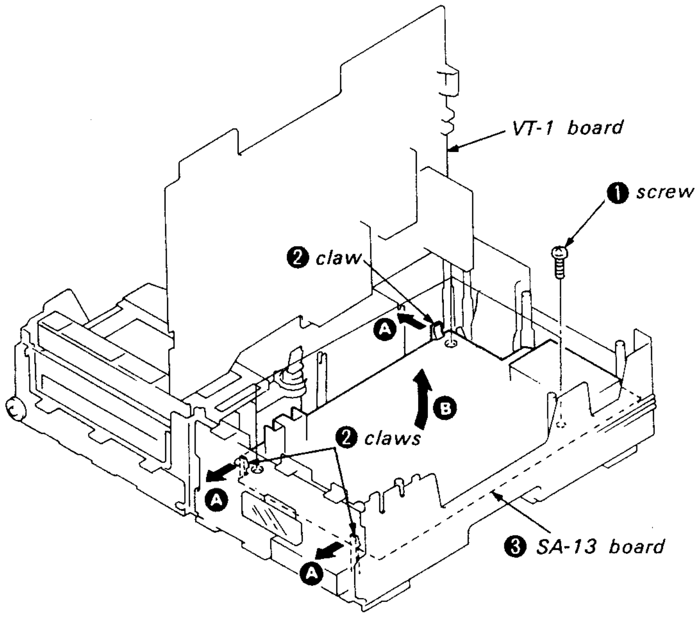
2-4. REMOVAL OF THE VT-1 BOARD

1) Remove the five screws ❶.
2) Remove the two claws ❷ in the direction shown by the arrow Ⓐ.
3) Open the VT-1 board ❸ in the direction shown by the arrow Ⓑ.


❶ screws
❸ VT-1 board
❷ claw
Ⓐ
Ⓑ
❷ claw
Ⓐ

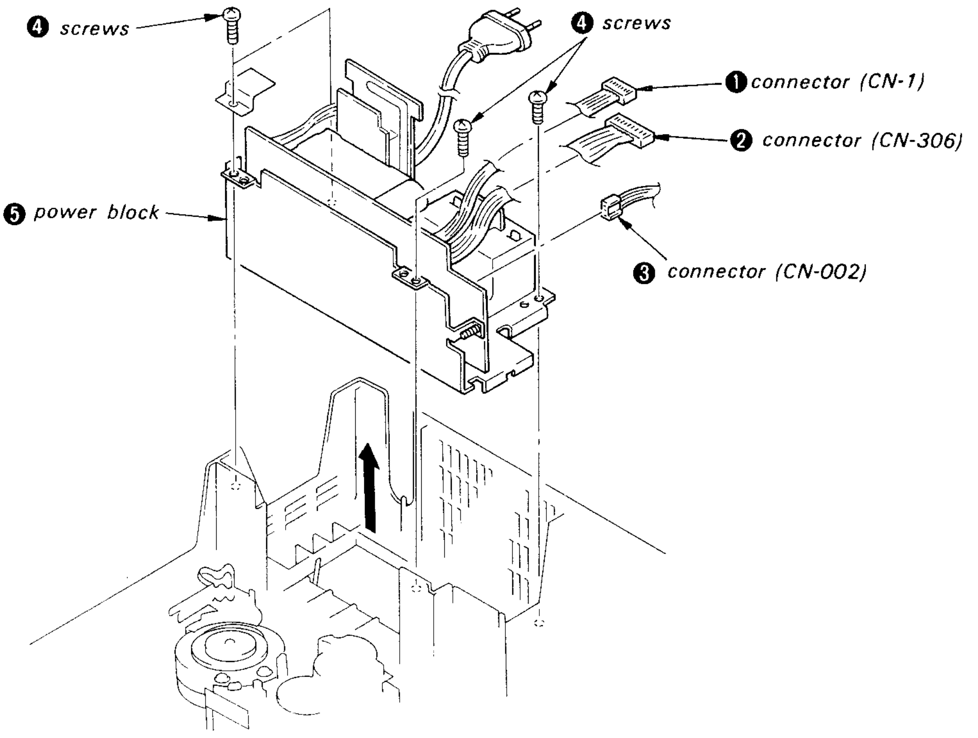
2-5. REMOVAL OF THE SA-13 BOARD

1) Refer to the "REMOVAL OF THE VT-1 BOARD" then remove the VT-1 board.
2) Remove the screw ❶.
3) Remove the three claws ❷ in the direction shown by the arrow Ⓐ.
4) Open the SA-13 board ❸ in the direction shown by the arrow Ⓑ.


VT-1 board
❶ screw
❷ claw
Ⓐ
Ⓑ
❷ claws
Ⓐ
Ⓐ
❸ SA-13 board

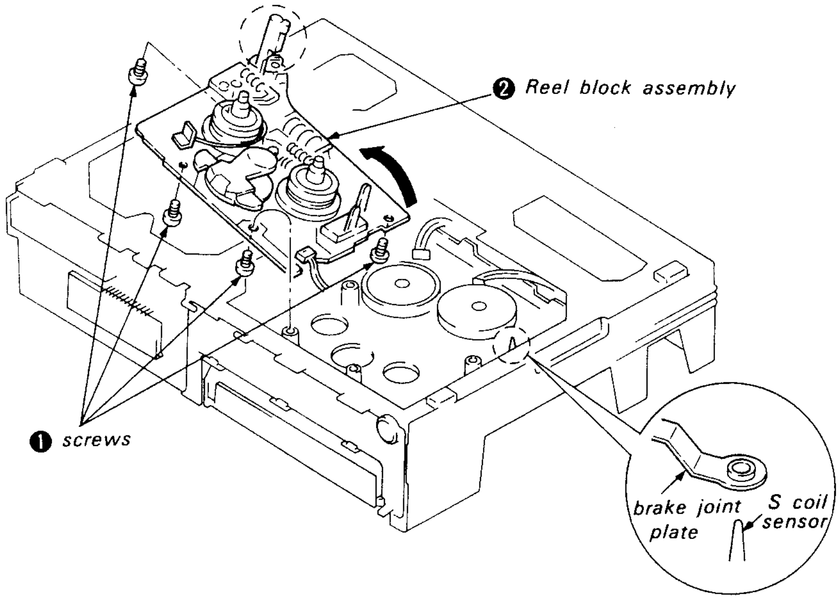
2-6. REMOVAL OF THE POWER BLOCK

1) Refer to the "REMOVAL OF THE VT-1 BOARD" then remove the VT-1 board.
2) Pull out the connector CN-1 (WHT) ❶ from the VT-1 board.
3) Pull out the connector CN-306 (WHT) ❷ from the SA-13 board.
4) Pull out the connector CN-002 (RED) ❸ from the PS-92 board.
5) Remove the four screws ❹.
6) Remove the power block ❺ in the direction shown by the arrow.


❹ screws
❹ screws
❶ connector (CN-1)
❷ connector (CN-306)
❺ power block
❸ connector (CN-002)

2-7. REMOVAL OF THE REEL BLOCK ASSEMBLY

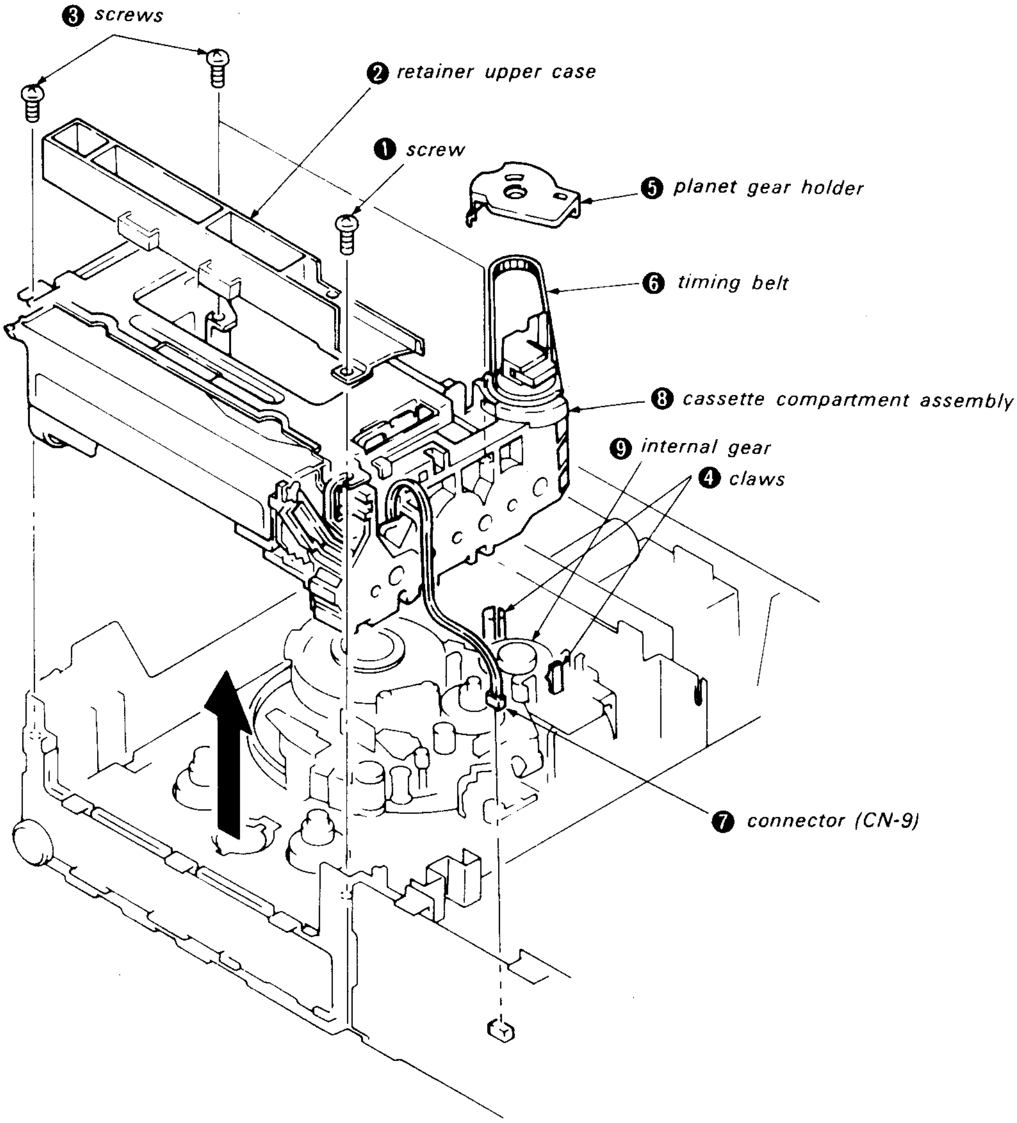
1) Place the set upside down.
2) Remove the four screws ❶.
3) Remove the reel block assembly ❷ in the direction shown by the arrow.


❷ Reel block assembly
❶ screws
brake joint plate
S coil sensor

<At mounting>

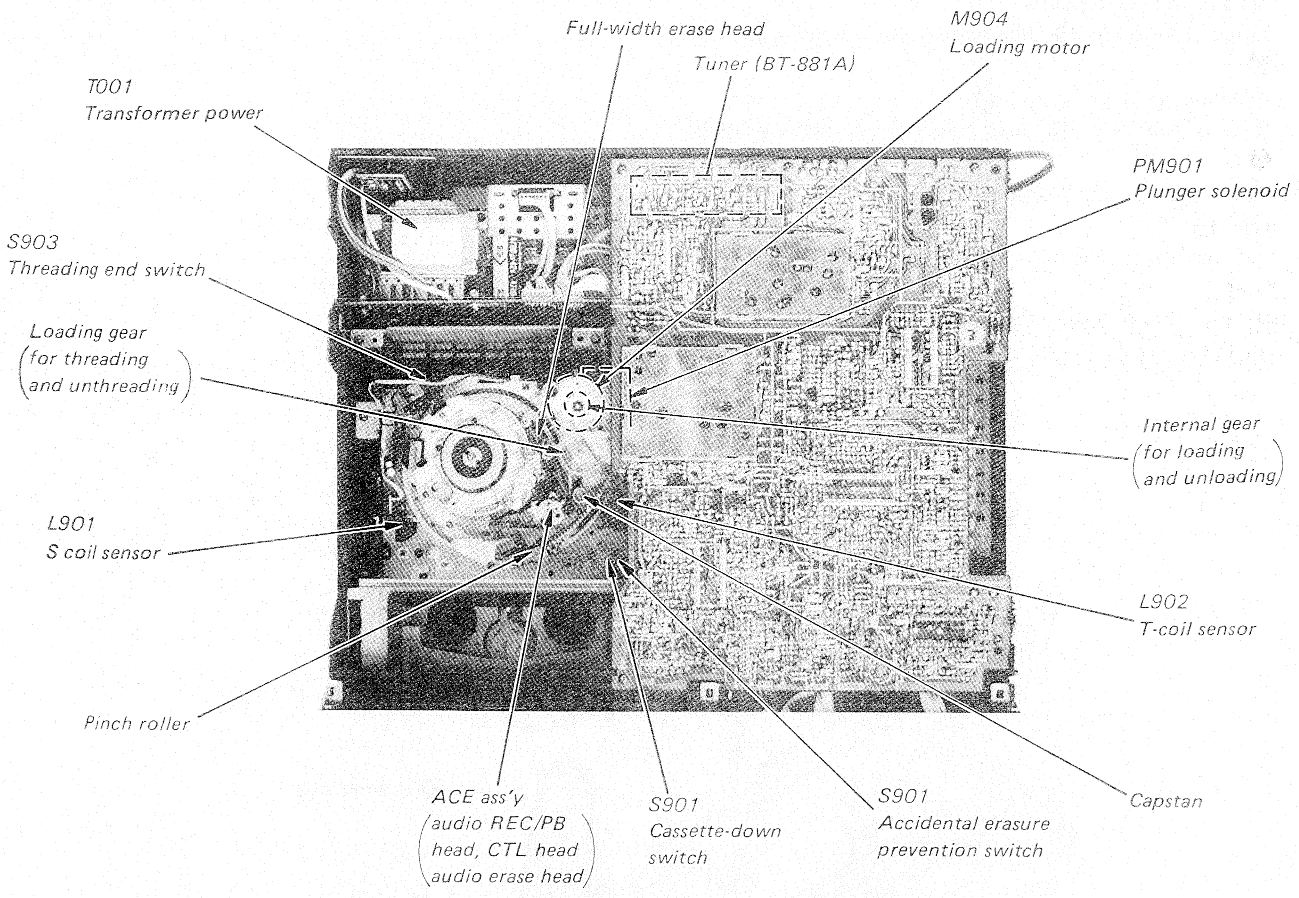
2-8. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY

1) Refer to the "REMOVAL OF THE VT-1 BOARD" then remove the VT-1 board.
2) Remove the screw ❶ then remove the retainer upper case ❷.
3) Remove the three screws ❸.
4) Remove two claws ❹ then remove the planet gear holder ❺.
5) Remove the timing belt (loading belt) ❻ from the internal gear ❾.
6) Pull out the connector CN-9 (BLK) ❼ from the SA-13 board.
7) Remove the FL cassette compartment assembly ❽ in the direction shown by the arrow.

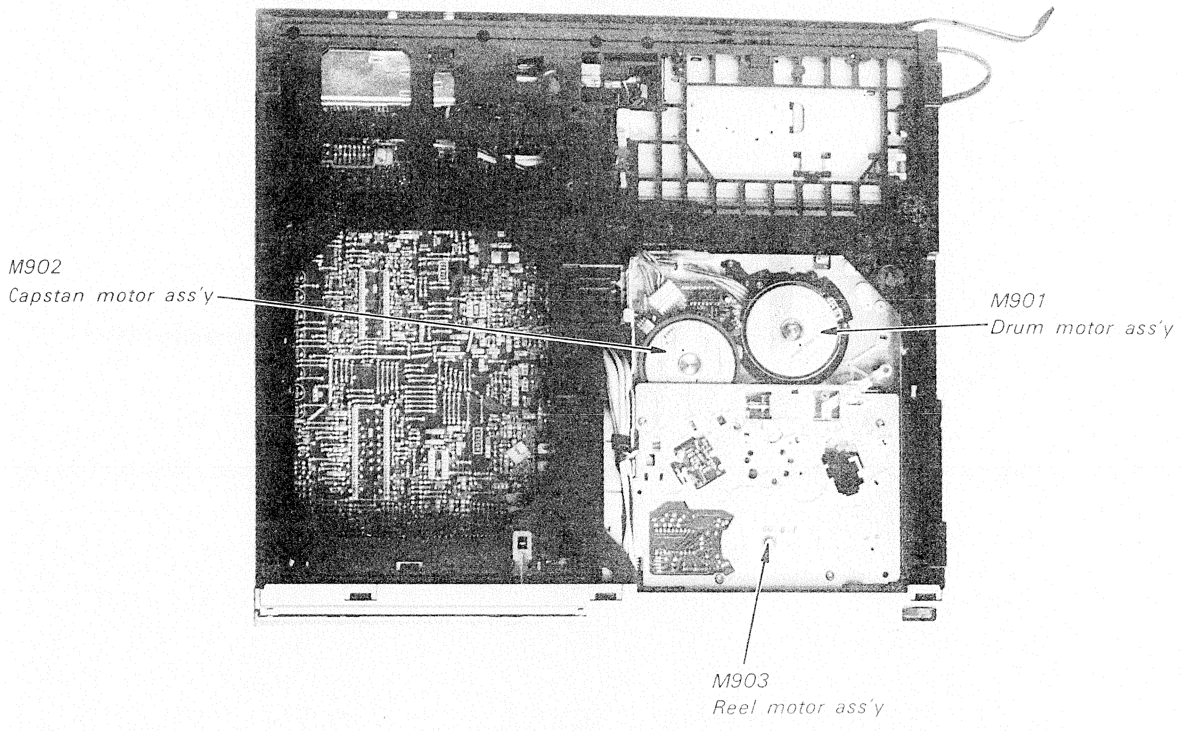

❸ screws
❷ retainer upper case
❶ screw
❺ planet gear holder
❻ timing belt
❽ cassette compartment assembly
❾ internal gear
❹ claws
❼ connector (CN-9)

2-9. INTERNAL VIEW

—Top side—

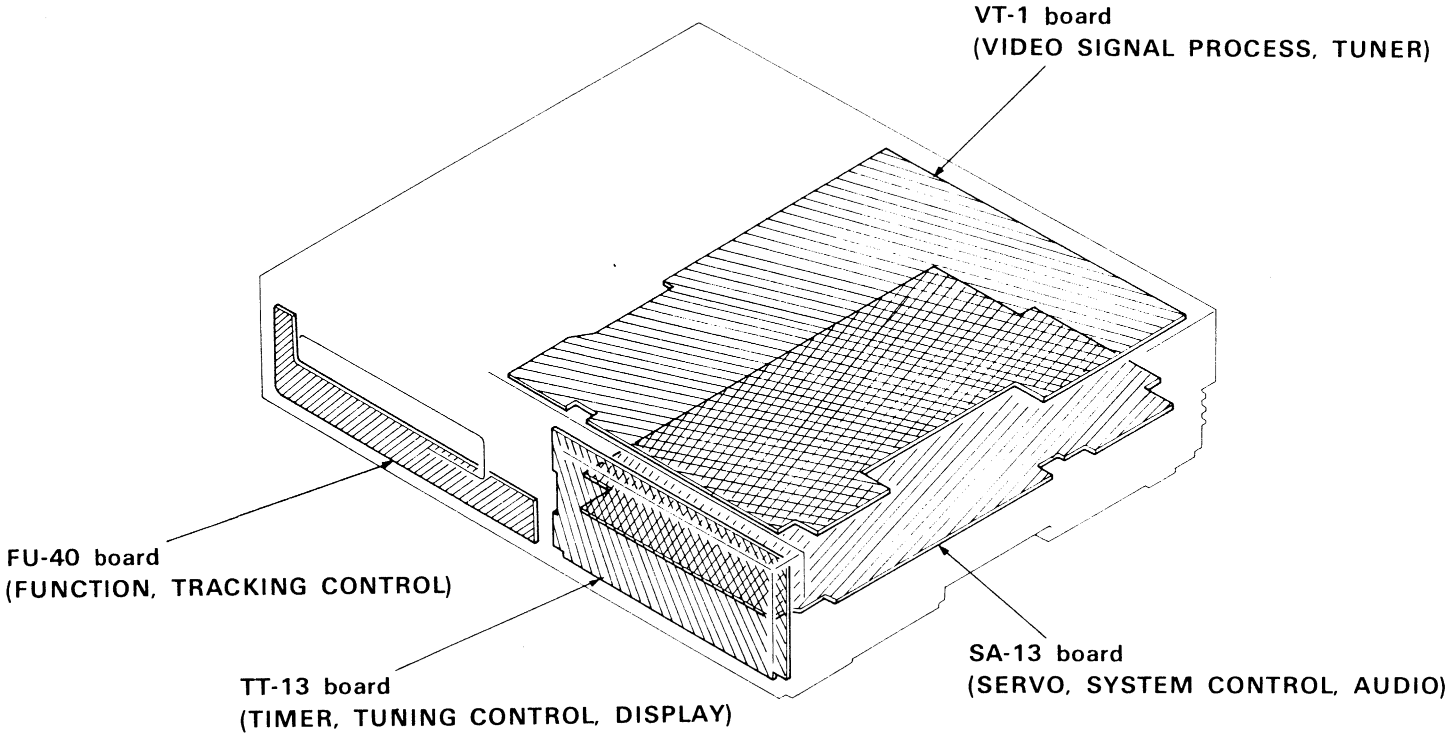

Full-width erase head
Tuner (BT-881A)
M904
Loading motor
T001
Transformer power
PM901
Plunger solenoid
S903
Threading end switch
Loading gear (for threading and unthreading)
Internal gear (for loading and unloading)
L901
S coil sensor
L902
T-coil sensor
Pinch roller
ACE ass'y (audio REC/PB head, CTL head audio erase head)
S901
Cassette-down switch
S901
Accidental erasure prevention switch
Capstan

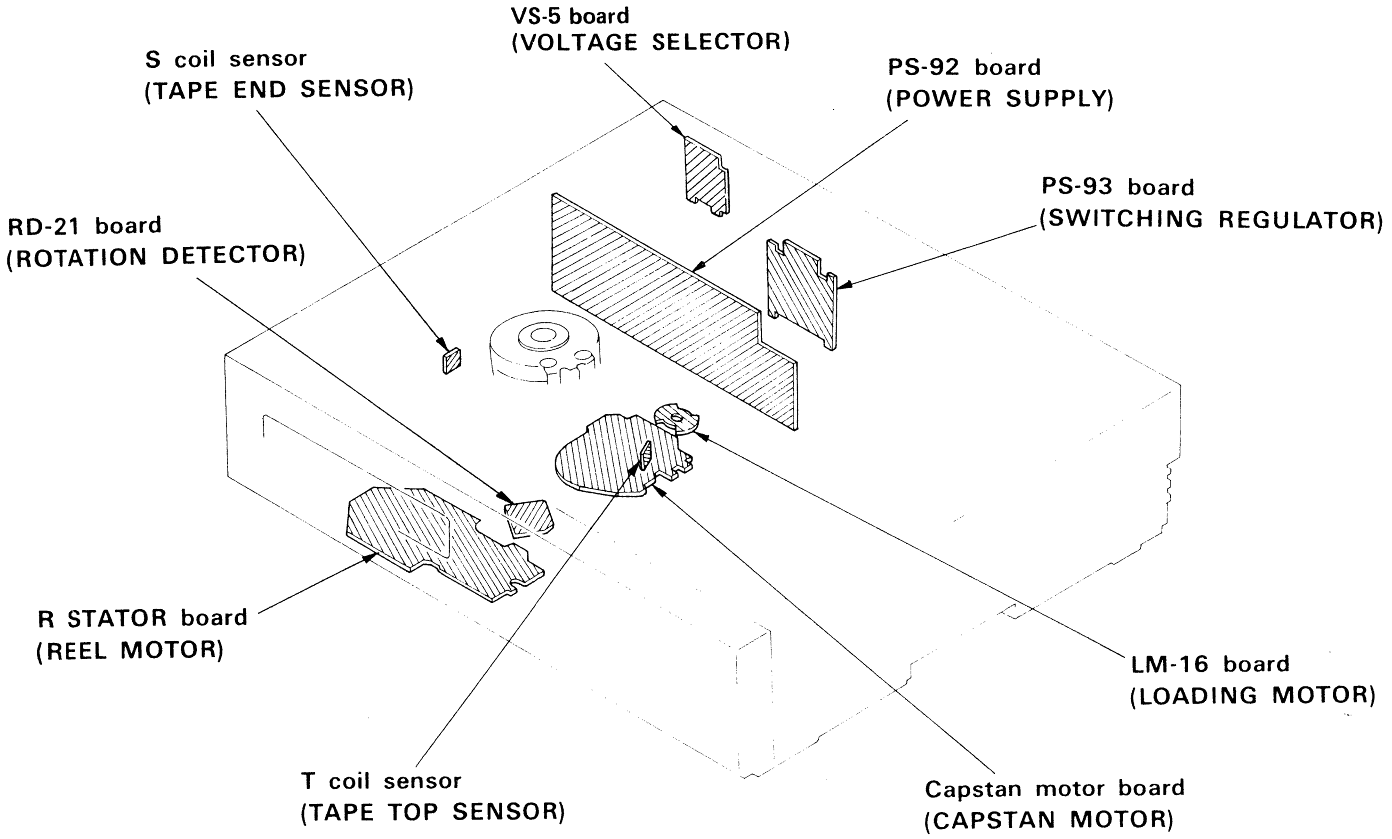
—Bottom side—


M902
Capstan motor ass'y
M901
Drum motor ass'y
M903
Reel motor ass'y

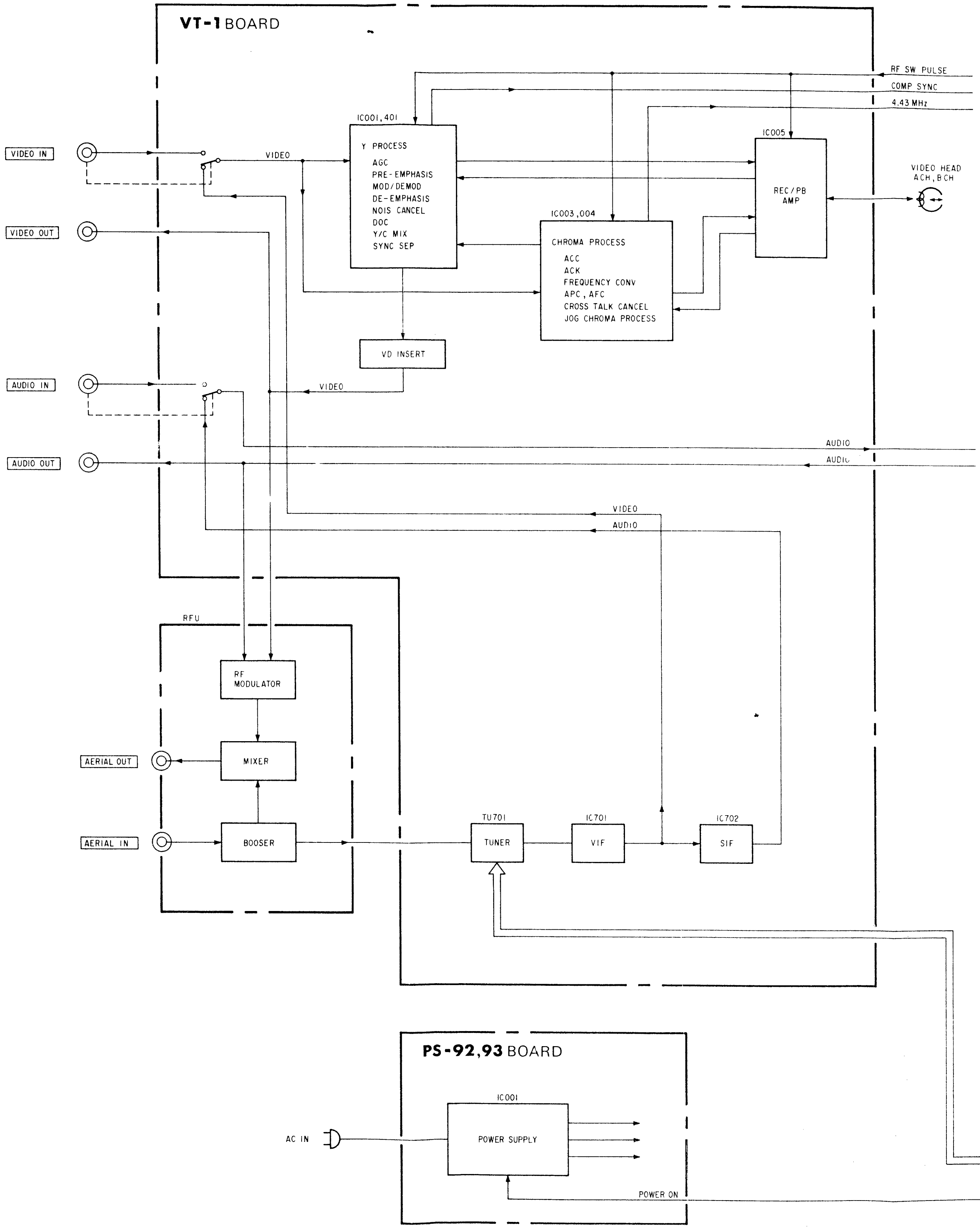
SECTION 3
DIAGRAMS

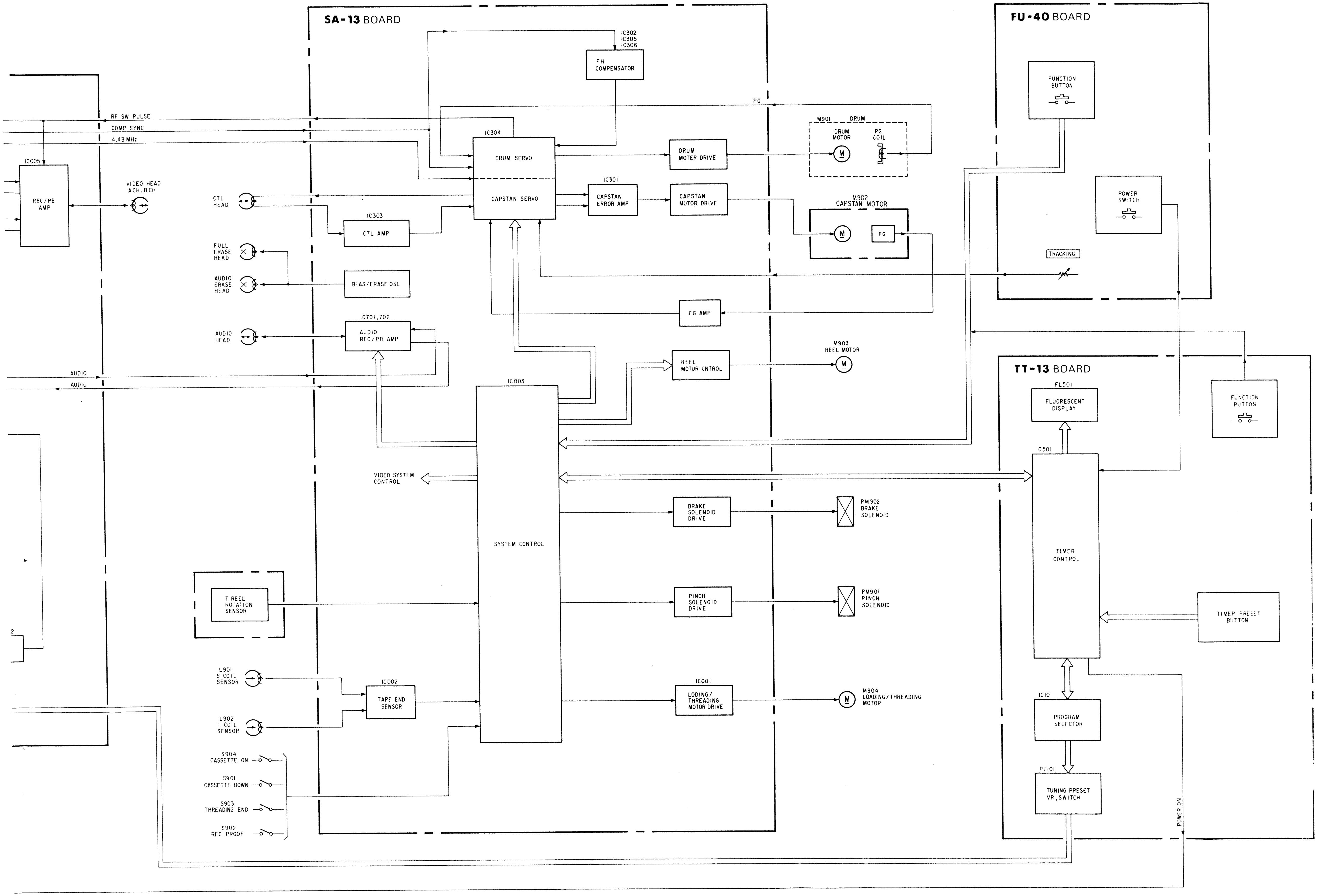
3-1. CIRCUIT BOARDS LOCATION


VT-1 board
(VIDEO SIGNAL PROCESS, TUNER)
FU-40 board
(FUNCTION, TRACKING CONTROL)
TT-13 board
(TIMER, TUNING CONTROL, DISPLAY)
SA-13 board
(SERVO, SYSTEM CONTROL, AUDIO)

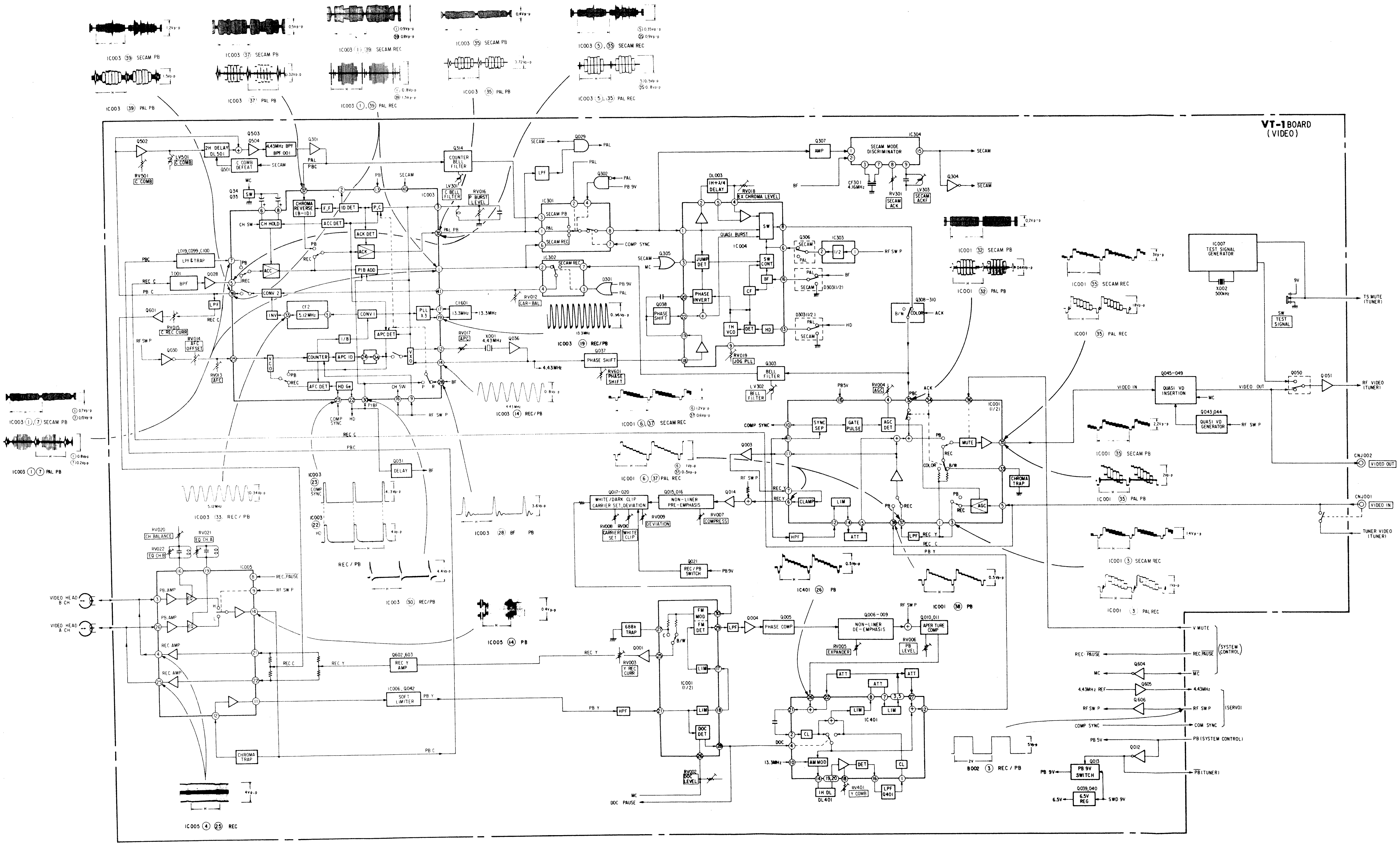

VS-5 board
(VOLTAGE SELECTOR)
S coil sensor
(TAPE END SENSOR)
PS-92 board
(POWER SUPPLY)
PS-93 board
(SWITCHING REGULATOR)
RD-21 board
(ROTATION DETECTOR)
R STATOR board
(REEL MOTOR)
LM-16 board
(LOADING MOTOR)
T coil sensor
(TAPE TOP SENSOR)
Capstan motor board
(CAPSTAN MOTOR)

3-2. OVERALL BLOCK DIAGRAM


VT-1 BOARD
RF SW PULSE
COMP SYNC
4.43 MHz
VIDEO IN
VIDEO OUT
AUDIO IN
AUDIO OUT
VIDEO
IC001, 401
Y PROCESS
AGC
PRE-EMPHASIS
MOD/DEMOD
DE-EMPHASIS
NOIS CANCEL
DOC
Y/C MIX
SYNC SEP
IC003, 004
CHROMA PROCESS
ACC
ACK
FREQUENCY CONV
APC, AFC
CROSS TALK CANCEL
JOG CHROMA PROCESS
IC005
REC/PB AMP
VIDEO HEAD ACH, BCH
VD INSERT
VIDEO
AUDIO
AUDIO
VIDEO
AUDIO
RFU
RF MODULATOR
MIXER
BOOSER
AERIAL OUT
AERIAL IN
TU701
TUNER
IC701
VIF
IC702
SIF
PS-92,93 BOARD
IC001
POWER SUPPLY
AC IN
POWER ON


SA-13 BOARD
IC302
IC305
IC306
FH COMPENSATOR
PG
RF SW PULSE
COMP SYNC
4.43 MHz
IC005
REC/PB AMP
VIDEO HEAD ACH, BCH
IC304
DRUM SERVO
CAPSTAN SERVO
CTL HEAD
IC303
CTL AMP
IC301
CAPSTAN ERROR AMP
DRUM MOTER DRIVE
CAPSTAN MOTOR DRIVE
M901
DRUM
DRUM MOTOR
PG COIL
M
M902
CAPSTAN MOTOR
FG
FULL ERASE HEAD
AUDIO ERASE HEAD
BIAS/ERASE OSC
FG AMP
IC701, 702
AUDIO REC/PB AMP
AUDIO HEAD
AUDIO
AUDIO
REEL MOTOR CNTROL
M903
REEL MOTOR
IC003
SYSTEM CONTROL
VIDEO SYSTEM CONTROL
BRAKE SOLENOID DRIVE
PM302
BRAKE SOLENOID
PINCH SOLENOID DRIVE
PM901
PINCH SOLENOID
T REEL ROTATION SENSOR
L901
S COIL SENSOR
L902
T COIL SENSOR
IC002
TAPE END SENSOR
IC001
LODING/THREADING MOTOR DRIVE
M904
LOADING/THREADING MOTOR
S904
CASSETTE ON
S901
CASSETTE DOWN
S903
THREADING END
S902
REC PROOF
FU-40 BOARD
FUNCTION BUTTON
POWER SWITCH
TRACKING
TT-13 BOARD
FL501
FLUORESCENT DISPLAY
FUNCTION PUTTON
IC501
TIMER CONTROL
TIMER PRESET BUTTON
IC101
PROGRAM SELECTOR
PU101
TUNING PRESET VR, SWITCH
POWER ON
2

3-3. VIDEO BLOCK DIAGRAM

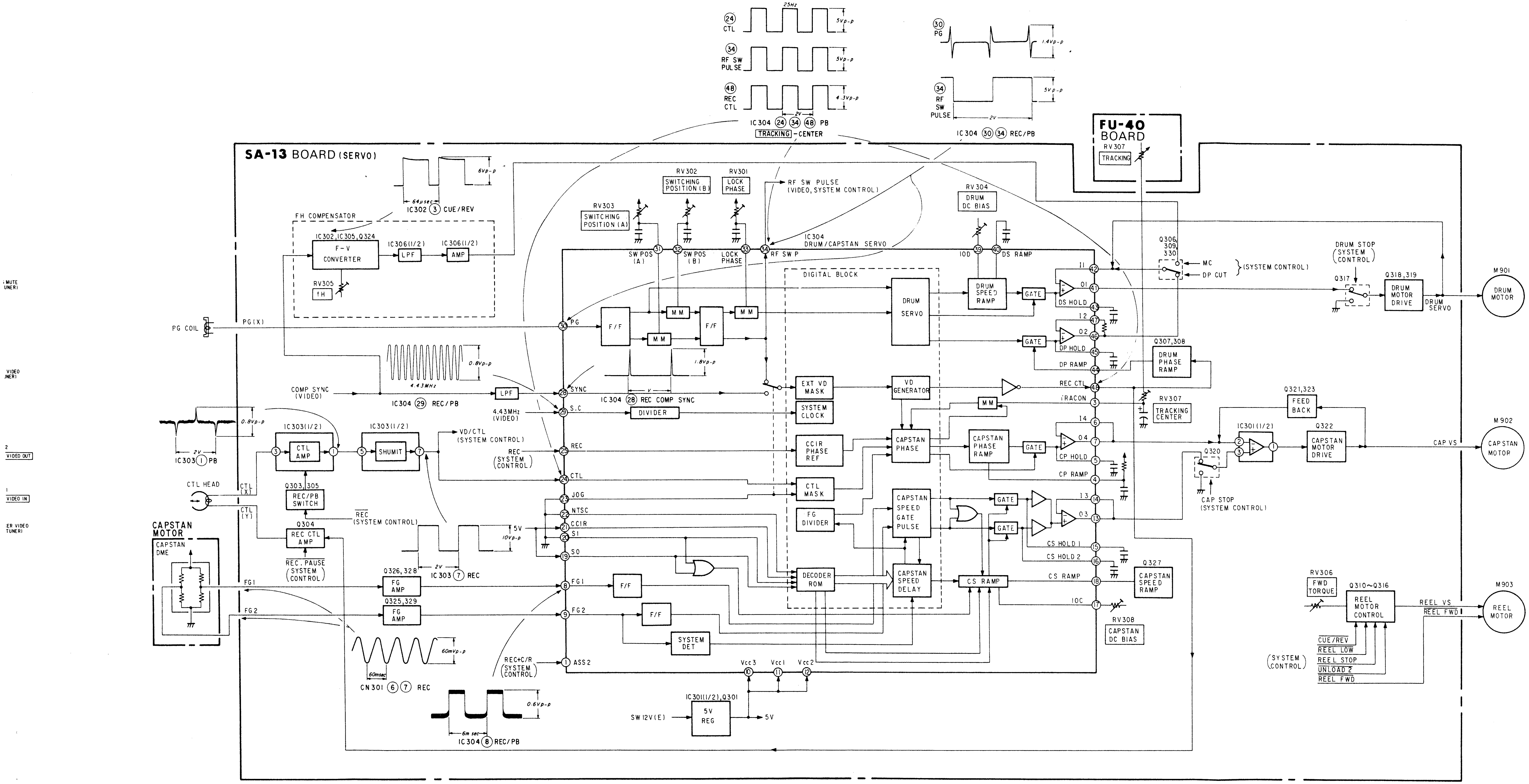


VT-1 BOARD (VIDEO)
IC003 ㊴ SECAM PB
IC003 ㊴ PAL PB
IC003 ㊲ SECAM PB
IC003 ㊲ PAL PB
IC003 ① ㊴ SECAM REC
IC003 ①, ㊴ PAL REC
IC003 ㉟ SECAM PB
IC003 ㉟ PAL PB
IC003 ⑤, ㉟ SECAM REC
IC003 ⑤, ㉟ PAL REC
IC003 ①, ⑦ SECAM PB
IC003 ① ⑦ PAL PB
Q502
RV501 C.COMB
LV501 C.COMB
2H DELAY DL501
Q503 Q504
4.43MHz BPF BPF 001
Q301
C.COMB DEFEAT
Q501
SECAM
PAL
PBC
Q314
COUNTER BELL FILTER
CHROMA REVERSE (B-ID)
F.F
ID DET
P.C
IC003
LV301 C.BELL FILTER
RV016 P.BURST LEVEL
ACC DET
ACK DET
ACK
P/B ADD
ACC
CH HOLD
CH SW
Q34 Q35
SW
MC
L019,C099,C100
LPF & TRAP
PBC
REC C
PB C
T001
BPF
Q028
LPF
CONV.2
CONV.1
INV
CF2 5.12MHz
PLL X3
CF601 13.3MHz
APC DET
RV012 CAR-BAL
RV017 APC
X001 4.43MHz
Q036
1/8
COUNTER
APC ID
VXO
VCO
Q601
RV015 C.REC CURR
RV014 AFC OFFSET
Q030
RF SW P
RV013 AFC
AFC DET
HD Ge
PB
REC
CH SW
P R
BF
RF SW P
COMP SYNC
HD
P/BF
REC C
PBC
Q031 DELAY
4.43MHz
IC003 ⑲ REC/PB
IC003 ⑭ REC/PB
Q037 PHASE SHIFT
RV601 PHASE SHIFT
IC003 ㉓ COMP SYNC
IC003 ㉒ HD
IC003 ㉝ REC/PB
IC003 ㉘ BF PB
IC003 ㉚ REC/PB
SECAM
Q029
PAL
LPF
Q302
PB 9V
IC301
SECAM PB
PAL
SECAM REC
COMP SYNC
IC302
SECAM REC
D301
CAR-BAL
Q307 AMP
IC304
SECAM MODE DISCRIMINATOR
CF301 4.16MHz
RV301 SECAM ACK
LV303 SECAM ACKF
Q304
SECAM
BF
DL003
1H+A/4 DELAY
RV018 EX CHROMA LEVEL
QUASI BURST
IC004
SW
SW CONT
BF
CF
JUMP DET
PHASE INVERT
Q305
Q038 PHASE SHIFT
1H VCO
DET
HD
RV019 JOG PLL
Q306 SECAM
IC303 1/2
RF SW P
D303(1/2)
D303(1/2)
Q303 BELL FILTER
LV302 BELL FILTER
Q308-310
B/W
COLOR
ACK
IC001 ㉜ SECAM PB
IC001 ㉜ PAL PB
IC001 ㉟ SECAM REC
IC001 ㉟ PAL REC
IC001 ㉟ SECAM PB
IC001 ㉟ PAL PB
IC001 ③ SECAM REC
IC001 ③ PAL REC
IC001 ⑥, ㊲ SECAM REC
IC001 ⑥, ㊲ PAL REC
IC007 TEST SIGNAL GENERATOR
X002 500kHz
SW TEST SIGNAL
TS MUTE (TUNER)
Q045-049 QUASI VD INSERTION
Q043,044 QUASI VD GENERATOR
VIDEO IN
VIDEO OUT
Q050
Q051
RF VIDEO (TUNER)
CNJ002 VIDEO OUT
CNJ001 VIDEO IN
TUNER VIDEO (TUNER)
PB5V
RV004 AGC
IC001 (1/2)
SYNC SEP
GATE PULSE
AGC DET
MUTE
CHROMA TRAP
AGC
CLAMP
LIM
ATT
HPF
LPF
REC Y
REC C
PB Y
Q003
Q014
Q017-020 WHITE/DARK CLIP CARRIER SET, DEVIATION
Q015,016 NON-LINER PRE-EMPHASIS
RV009 DEVIATION
RV007 COMPRESS
RV008 CARRIER SET
RV010 WHITE CLIP
Q021 REC/PB SWITCH
PB 9V
IC401 ㉖ PB
IC001 ㊳ PB
RV020 CH BALANCE
RV021 EQ CH A
RV022 EQ CH B
IC005
REC PAUSE
RF SW P
VIDEO HEAD B CH
VIDEO HEAD A CH
PB AMP
REC AMP
Q602,603 REC Y AMP
IC006, Q042 SOFT LIMITER
CHROMA TRAP
PB C
PB Y
HPF
IC005 ⑭ PB
IC005 ④ ㉓ REC
688k TRAP
Q001
RV003 Y REC CURR
FM MOD
FM DET
LIM
DOC DET
IC001 (1/2)
RV002 DOC LEVEL
MC
DOC PAUSE
Q004
Q005 PHASE COMP
Q006-009 NON-LINER DE-EMPHASIS
RV005 EXPANDER
Q010,011 APER TURE COMP
RV006 PB LEVEL
ATT
IC401
CL
DOC
13.3MHz
AM MOD
DET
1H DL DL401
RV401 Y COMB
LPF Q401
B002 ③ REC/PB
V MUTE
REC PAUSE
MC
(SYSTEM CONTROL)
Q604
Q605
4.43MHz REF
4.43MHz
Q606
RF SW P
(SERVO)
COMP SYNC
PB 5V
PB (SYSTEM CONTROL)
Q012
Q013 PB 9V SWITCH
PB (TUNER)
Q039,040 6.5V REG
6.5V
SWD 9V

3-4. SE

CAPST
MOTO
CAPST
DME

3-4. SERVO BLOCK DIAGRAM



SA-13 BOARD (SERVO)
FU-40 BOARD
RV307 TRACKING
IC304 24 34 48 PB
TRACKING - CENTER
IC304 30 34 REC/PB
24 CTL
34 RF SW PULSE
48 REC CTL
25Hz
5Vp-p
4.3Vp-p
30 PG
1.4Vp-p
34 RF SW PULSE
5Vp-p
2V
6Vp-p
64μsec
IC302 3 CUE/REV
FH COMPENSATOR
IC302, IC305, Q324
F-V CONVERTER
IC306(1/2) LPF
IC306(1/2) AMP
RV305 fH
RV303 SWITCHING POSITION (A)
RV302 SWITCHING POSITION (B)
RV301 LOCK PHASE
RF SW PULSE (VIDEO, SYSTEM CONTROL)
IC304 DRUM/CAPSTAN SERVO
RV304 DRUM DC BIAS
SW POS (A)
SW POS (B)
LOCK PHASE
RF SW P
IOD
DS RAMP
DIGITAL BLOCK
DRUM SERVO
DRUM SPEED RAMP
GATE
DS HOLD
DP HOLD
DP RAMP
F/F
MM
1.8Vp-p
PG COIL
PG(X)
0.8Vp-p
4.43MHz
COMP SYNC (VIDEO)
IC304 29 REC/PB
LPF
SYNC
S.C
4.43MHz (VIDEO)
IC304 28 REC COMP SYNC
DIVIDER
EXT VD MASK
SYSTEM CLOCK
VD GENERATOR
REC CTL
TRACON
RV307 TRACKING CENTER
Q307,308 DRUM PHASE RAMP
Q306, 309, 330
MC
DP CUT
(SYSTEM CONTROL)
DRUM STOP (SYSTEM CONTROL)
Q317
Q318,319 DRUM MOTOR DRIVE
DRUM SERVO
M901 DRUM MOTOR
0.8Vp-p
2V
IC303 1 PB
IC303(1/2) CTL AMP
IC303(1/2) SHUMIT
VD/CTL (SYSTEM CONTROL)
REC (SYSTEM CONTROL)
REC
CTL
CCIR PHASE REF
CAPSTAN PHASE
CAPSTAN PHASE RAMP
CP HOLD
CP RAMP
CTL MASK
FG DIVIDER
CAPSTAN SPEED GATE PULSE
CAPSTAN SPEED DELAY
DECODER ROM
CS RAMP
CS HOLD 1
CS HOLD 2
IOC
Q327 CAPSTAN SPEED RAMP
RV308 CAPSTAN DC BIAS
Q321,323 FEED BACK
IC301(1/2)
Q322 CAPSTAN MOTOR DRIVE
CAP VS
M902 CAPSTAN MOTOR
Q320
CAP STOP (SYSTEM CONTROL)
CTL HEAD
CTL (X)
CTL (Y)
Q303,305 REC/PB SWITCH
Q304 REC CTL AMP
REC (SYSTEM CONTROL)
REC. PAUSE (SYSTEM CONTROL)
5V
10Vp-p
2V
IC303 7 REC
JOG
NTSC
CCIR
S1
S0
CAPSTAN MOTOR
CAPSTAN DME
FG1
FG2
Q326,328 FG AMP
Q325,329 FG AMP
F/F
SYSTEM DET
60mVp-p
60msec
CN301 6 7 REC
REC+C/R (SYSTEM CONTROL)
ASS 2
0.6Vp-p
6m sec
IC304 8 REC/PB
Vcc3
Vcc1
Vcc2
IC301(1/2), Q301
5V REG
SW12V(E)
5V
RV306 FWD TORQUE
Q310~Q316 REEL MOTOR CONTROL
REEL VS
REEL FWD
M903 REEL MOTOR
(SYSTEM CONTROL)
CUE/REV
REEL LOW
REEL STOP
UNLOAD 2
REEL FWD
MUTE
UNER)
VIDEO
NER)
VIDEO OUT
VIDEO IN
ER VIDEO
TUNER)

3-5. SYSTEM CONTROL CIRCUIT AND MECHANISM BLOCK INTERFACE

MODE / SIGNAL	I/O	Pin No.	EJECTED	LOADING	THREADING	STOP	UN-THREADING	UN-LOADING	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
													CUE	REV				CUE	REV
TOP/$\overline{\text{END}}$	I	IC003 3pin	H	H	H	L	H	H	L	H	L	L	L	H	L	L	L	L	H
$\overline{\text{LOAD}}$	O	IC003 5pin	H	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
$\overline{\text{UNLOAD}}$	O	IC003 6pin	H	H	H	H	L	L	H	H	H	H	H	H	H	H	H	H	H
$\overline{\text{REC PROOF}}$	I	IC003 13pin	H	H	H/L	H/L	H/L	H	H/L	H/L	H/L	H/L	H/L	H/L	L	L	L	H/L	H/L
$\overline{\text{C·ON}}$	I	IC003 15pin	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{C·DWN}}$	I	IC003 16pin	H	H	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{LD END}}$	I	IC003 17pin	H	H	H	L	H	H	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{UNBRK S}}$	O	IC003 21pin	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
$\overline{\text{UNBRK H}}$	O	IC003 22pin	H	H	L	H	L	H	L	L	L	H	L	L	L	H	L	L	L
$\overline{\text{PINCH S}}$	O	IC003 23pin	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
$\overline{\text{PINCH H}}$	O	IC003 24pin	H	L	H	H	H	L	H	H	L	H	L	L	L	H	L	H	H

3-6. SYSTEM CONTROL CIRUIT AND TIMER CIRCUIT INTERFACE

MODE / SIGNAL	I/O	Pin No.	STOP	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
								CUE	REV				CUE	REV
$\overline{\text{COUNTER RESET}}$	I	IC003 19pin												
$\overline{\text{RT RQST}}$	I	IC003 28pin												
$\overline{\text{SC}}$	O	IC003 30pin												
RTSD	I	IC003 31pin												
SSD	O	IC003 33pin												
$\overline{\text{REC READY}}$	O	IC003 42pin	H/L	H	H	H	H	H	H	H	H	L	H	H

3-7. SYSTEM CONTROL CIRCUIT AND FUNCTION BLOCK INTE

MODE / SIGNAL	I/O	Pin No.	STOP	FF	REW	PB
$\overline{\text{C·IN}}$ LED*1	O	IC003 4pin	L	L	L	L
$\overline{\text{EJECT·K}}$	I	IC003 34pin	H	H	H	H
$\overline{\text{STOP·K}}$	I	IC003 35pin	H	H	H	H
$\overline{\text{FF·K}}$	I	IC003 36pin	H	H	H	H
$\overline{\text{REW·K}}$	I	IC003 37pin	H	H	H	H
$\overline{\text{PB·K}}$	I	IC003 38pin	H	H	H	H
$\overline{\text{PAUSE·K}}$	I	IC003 39pin	H	H	H	H
$\overline{\text{REC·K}}$	I	IC003 40pin	H	H	H	H
$\overline{\text{TV/VTR K}}$*1	I	IC003 41pin	H	H	H	H
TV/VTR LED*1	O	IC003 43pin	H/L	H/L	H/L	H/L
$\overline{\text{FF LED}}$*1	O	IC003 44pin	H	L	H	H
$\overline{\text{REW LED}}$*1	O	IC003 45pin	H	H	L	H
$\overline{\text{PB LED}}$*1	O	IC003 46pin	H	H	H	L
$\overline{\text{PAUSE}}$ LED	O	IC003 47pin	H	H	H	H
$\overline{\text{REC LED}}$	O	IC003 48pin	H	H	H	H

*1 Not used

3-8. SYSTEM CONTROL CIRCUIT AND ITS PERIPHERAL CIRCU

MODE / SIGNAL	I/O	Pin No.	STOP	FF	REW	PB
TOP/$\overline{\text{END}}$	O	IC003 3pin	L	L	H	L
$\overline{\text{TEND}}$*1	I	IC003 9pin	H	H	H	H

*1 "L" at tape end.

PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
		CUE	REV				CUE	REV
L	L	L	H	L	L	L	L	H
H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H
H/L	H/L	H/L	H/L	L	L	L	H/L	H/L
L	L	L	L	L	L	L	L	L
L	L	L	L	L	L	L	L	L
L	L	L	L	L	L	L	L	L
H	H	H	H	H	H	H	H	H
L	H	L	L	L	H	L	L	L
H	H	H	H	H	H	H	H	H
L	H	L	L	L	H	L	H	H

REC·AUSE	TIMER REC	FR SEARCH	
		CUE	REV
H	L	H	H

3-7. SYSTEM CONTROL CIRCUIT AND FUNCTION BLOCK INTERFACE

SIGNAL	I/O	Pin No.	STOP	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
MODE								CUE	REV				CUE	REV
C·IN LED*1	O	IC003 4pin	L	L	L	L	L	L	L	L	L	L	L	L
EJECT·K	I	IC003 34pin	H	H	H	H	H	H	H	H	H	H	H	H
STOP·K	I	IC003 35pin	H	H	H	H	H	H	H	H	H	H	H	H
FF·K	I	IC003 36pin	H	H	H	H	H	L	H	H	H	H	L	H
REW·K	I	IC003 37pin	H	H	H	H	H	H	L	H	H	H	H	L
PB·K	I	IC003 38pin	H	H	H	H	H	H	H	H	H	H	H	H
PAUSE·K	I	IC003 39pin	H	H	H	H	H	H	H	H	H	H	H	H
REC·K	I	IC003 40pin	H	H	H	H	H	H	H	H	H	H	H	H
TV/VTR K*1	I	IC003 41pin	H	H	H	H	H	H	H	H	H	H	H	H
TV/VTR LED*1	O	IC003 43pin	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L
FF LED*1	O	IC003 44pin	H	L	H	H	H	L	H	H	H	H	L	H
REW LED*1	O	IC003 45pin	H	H	L	H	H	H	L	H	H	H	H	L
PB LED*1	O	IC003 46pin	H	H	H	L	L	L	L	H	H	H	L	L
PAUSE LED	O	IC003 47pin	H	H	H	H	L	H	H	H	L	H	H	H
REC LED	O	IC003 48pin	H	H	H	H	H	H	H	L	L	L	H	H

*1 Not used

3-8. SYSTEM CONTROL CIRCUIT AND ITS PERIPHERAL CIRCUIT INTERFACE

SIGNAL	I/O	Pin No.	STOP	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
MODE								CUE	REV				CUE	REV
TOP/END	O	IC003 3pin	L	L	H	L	L	L	H	L	L	L	L	H
TEND*1	I	IC003 9pin	H	H	H	H	H	H	H	H	H	H	H	H

*1 "L" at tape end.

3-9. SYSTEM CONTROL CIRCUIT AND REEL MOTOR CONTROL CIRCUIT INTERFACE

MODE / SIGNAL	I/O	Pin No.	EJECTED	LOADING	THREADING	STOP	UN-THREADING	UN-LOADING	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
													CUE	REV				CUE	REV
F/R*1	O	IC003 11pin																	
REEL FG	I	IC003 12pin																	
S REEL FG*1	I	IC003 18pin																	
CUE/REV	O	IC003 54pin	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	H	H
$\overline{\text{UNLOAD 2}}$	O	IC003 55pin	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
REEL LOW	O	IC003 58pin	L	L	H	L	L	L	L	L	H	H	L	L	H	H	H	L	L
$\overline{\text{REEL FWD}}$	O	IC003 59pin	L	L	L	L	L	L	L	H	L	L	L	H	L	L	L	L	H
REEL STOP	O	IC003 60pin	H	H	L	H	L	H	L	L	L	H	L	L	L	H	L	L	L

*1 Not used.

3-10. SYSTEM CONTROL CIRCUIT AND VIDEO CIRCUIT INTERFACE

MODE / SIGNAL	I/O	Pin No.	STOP (E-E)	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
								CUE	REV				CUE	REV
PB	O	IC003 52pin	L	L	L	H	H	H	H	L	L	L	H	H
REC·$\overline{\text{PAUSE}}$	O	IC003 53pin	H	H	H	H	H	H	H	L	H	L	H	H
V MUTE	O	IC003 56pin	L	L	L	L	L	L	L	L	L	L	L	L
MC	O	IC003 57pin	L	L	L	L	H	H	H	L	L	L	H	H

3-11. SYSTEM CONTROL CURCUIT AND SERVO CI

MODE / SIGNAL	I/O	Pin No.	STOP	FF	R
$\overline{\text{CAP RVS}}$*1	O	IC003 10pin			
DP CUT	O	IC003 14pin	L	L	
VD/CTL	I	IC003 29pin		CTL	(
$\overline{\text{REC·LED}}$	O	IC003 48pin	H	H	
DRUM STOP	O	IC003 50pin	H	L	
CAP STOP	O	IC003 51pin	H	H	
PB	O	IC003 52pin	L	L	
$\overline{\text{REC·PAUSE}}$	O	IC003 53pin	H	H	
CUE/REV	O	IC003 54pin	L	L	
MC	O	IC003 57pin	L	L	
REC C/R	O	IC003 61pin	L	L	

3-12. SYSTEM CONTROL CURCUIT AND AUDIO CII

MODE / SIGNAL	I/O	Pin No.	STOP (E-E)	FF	R
A MUTE	O	IC003 7pin	L	L	
$\overline{\text{B CONT}}$	O	IC003 8pin	H	H	
PB	O	IC003 52pin	L	L	

PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
	CUE	REV				CUE	REV
L	H	H	L	L	L	H	H
H	H	H	H	H	H	H	H
H	L	L	H	H	H	L	L
L	L	H	L	L	L	L	H
H	L	L	L	H	L	L	L

· :E	TIMER REC	FR SEARCH	
		CUE	REV
	L	H	H
	L	H	H
	L	L	L
	L	H	H

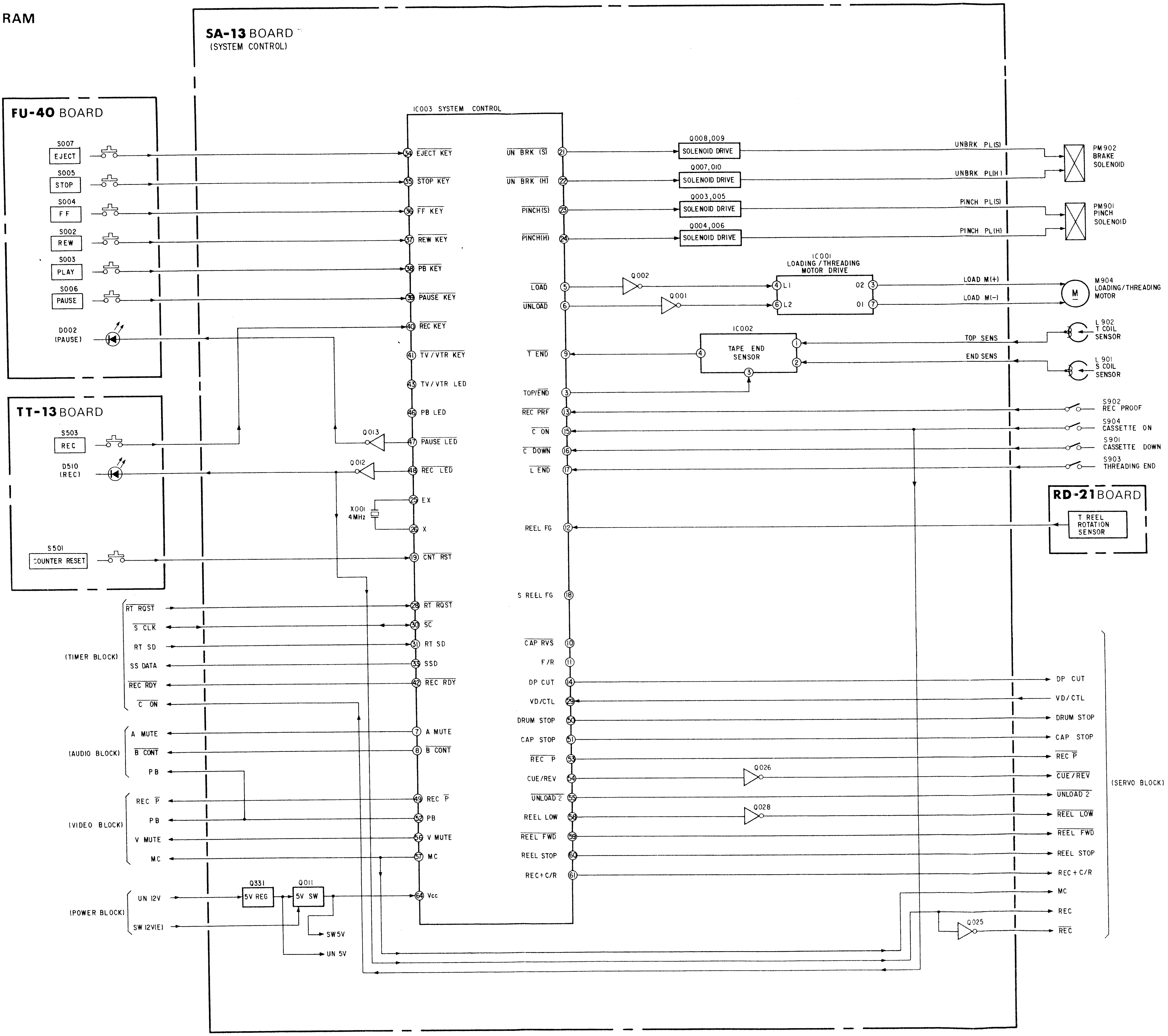
3-11. SYSTEM CONTROL CURCUIT AND SERVO CURCUIT INTERFACE

MODE SIGNAL	I/O	Pin No.	STOP	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
								CUE	REV				CUE	REV
$\overline{\text{CAP RVS}}^{*1}$	O	IC003 10pin												
DP CUT	O	IC003 14pin	L	L	L	L	L	H	H	L	L	L	H	H
VD/CTL	I	IC003 29pin		CTL	CTL	CTL		CTL	CTL	VD		VD	CTL	CTL
$\overline{\text{REC·LED}}$	O	IC003 48pin	H	H	H	H	H	H	H	L	L	L	H	H
DRUM STOP	O	IC003 50pin	H	L	L	L	L	L	L	L	L	L	L	L
CAP STOP	O	IC003 51pin	H	H	H	L	L	L	L	L	L	L	H	H
PB	O	IC003 52pin	L	L	L	H	H	H	H	L	L	L	H	H
$\overline{\text{REC·PAUSE}}$	O	IC003 53pin	H	H	H	H	H	H	H	L	H	L	H	H
CUE/REV	O	IC003 54pin	L	L	L	L	L	H	H	L	L	L	H	H
MC	O	IC003 57pin	L	L	L	L	H	H	H	L	L	L	H	H
REC C/R	O	IC003 61pin	L	L	L	L	L	H	H	H	L	H	H	H

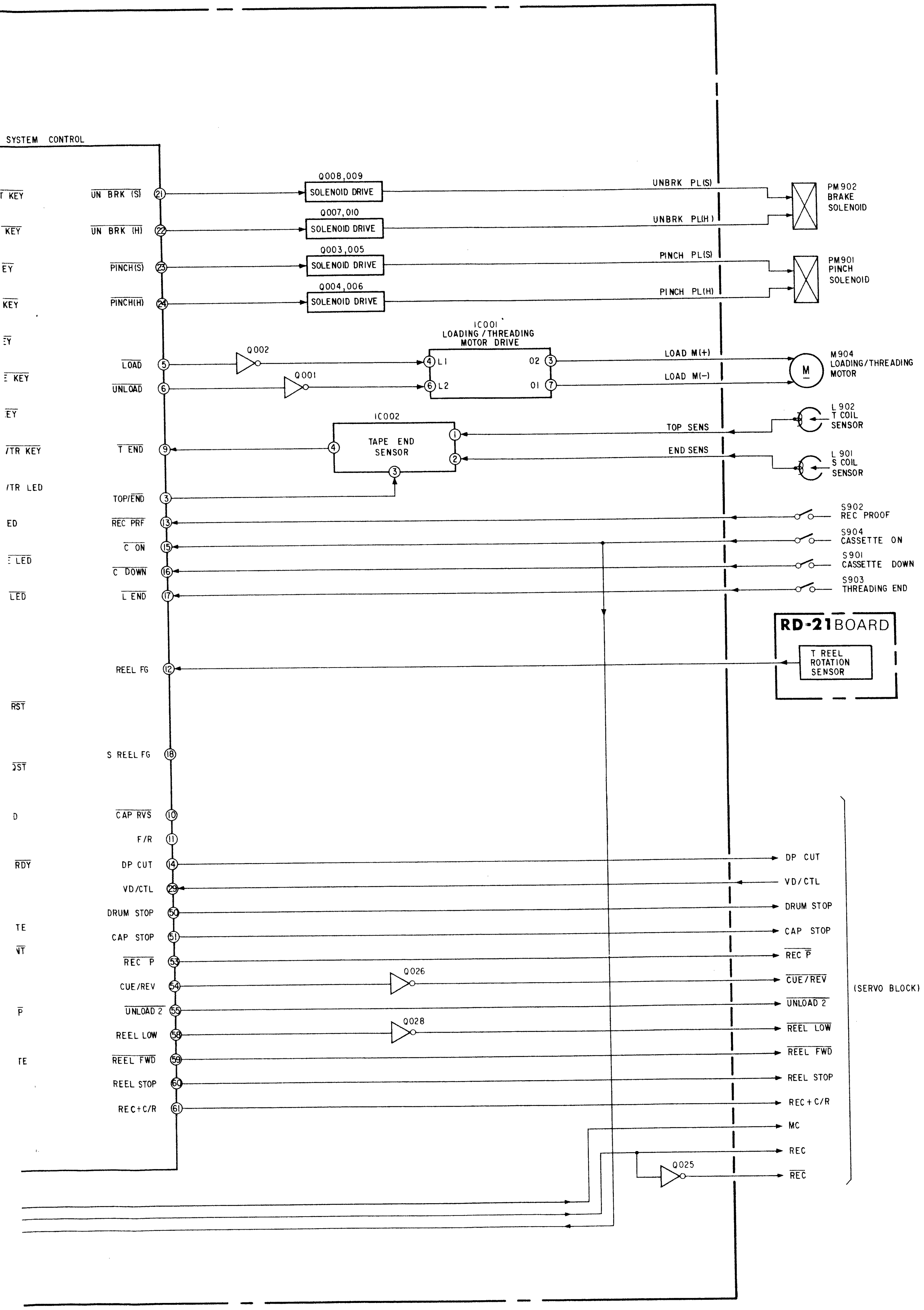
3-12. SYSTEM CONTROL CURCUIT AND AUDIO CIRCUIT INTERFACE

MODE SIGNAL	I/O	Pin No.	STOP (E-E)	FF	REW	PB	PB·PAUSE	PICTURE SEARCH		REC	REC·PAUSE	TIMER REC	FR SEARCH	
								CUE	REV				CUE	REV
A MUTE	O	IC003 7pin	L	L	L	L	H	H	H	L	L	L	H	H
$\overline{\text{B CONT}}$	O	IC003 8pin	H	H	H	H	H	H	H	L	H	L	H	H
PB	O	IC003 52pin	L	L	L	H	H	H	H	L	L	L	H	H

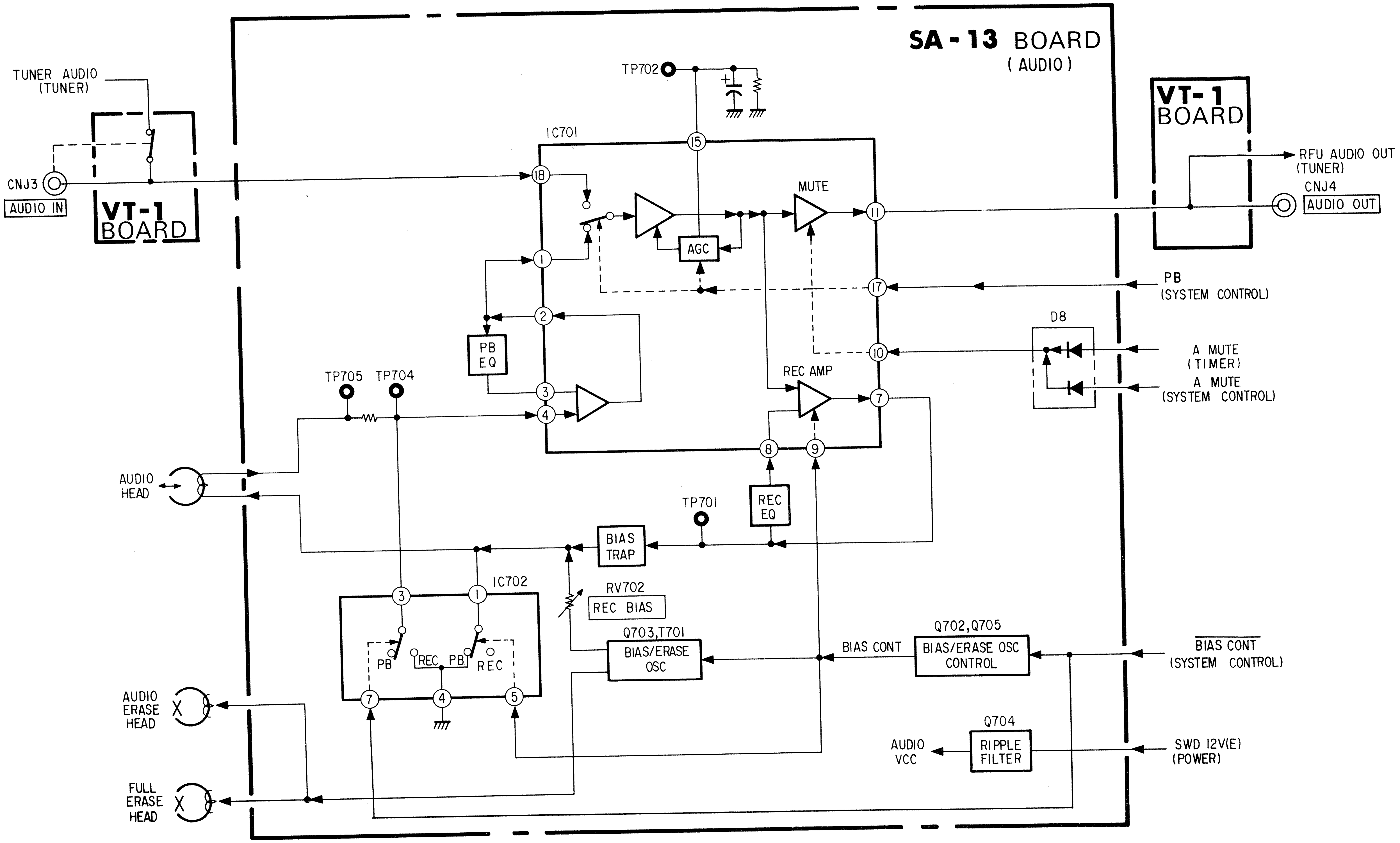
3-13. SYSTEM CONTROL BLOCK DIAGRAM



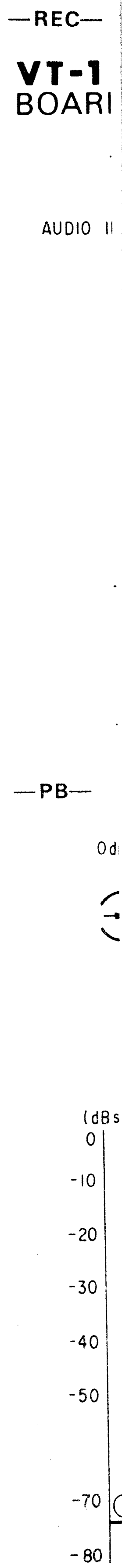
SA-13 BOARD
(SYSTEM CONTROL)
FU-40 BOARD
S007 EJECT
S005 STOP
S004 FF
S002 REW
S003 PLAY
S006 PAUSE
D002 (PAUSE)
TT-13 BOARD
S503 REC
D510 (REC)
S501 COUNTER RESET
IC003 SYSTEM CONTROL
34 EJECT KEY
35 STOP KEY
36 FF KEY
37 REW KEY
38 PB KEY
39 PAUSE KEY
40 REC KEY
41 TV/VTR KEY
43 TV/VTR LED
46 PB LED
47 PAUSE LED
48 REC LED
25 EX
26 X
19 CNT RST
28 RT RQST
30 SC
31 RT SD
33 SSD
42 REC RDY
7 A MUTE
8 B CONT
49 REC P
52 PB
56 V MUTE
57 MC
64 Vcc
Q013
Q012
X001 4MHz
(TIMER BLOCK)
RT RQST
S CLK
RT SD
SS DATA
REC RDY
C ON
(AUDIO BLOCK)
A MUTE
B CONT
PB
(VIDEO BLOCK)
REC P
PB
V MUTE
MC
(POWER BLOCK)
UN 12V
SW 12V(E)
Q331 5V REG
Q011 5V SW
SW5V
UN 5V
UN BRK (S) 21
UN BRK (H) 22
PINCH(S) 23
PINCH(H) 24
LOAD 5
UNLOAD 6
T END 9
TOP/END 3
REC PRF 13
C ON 15
C DOWN 16
L END 17
REEL FG 12
S REEL FG 18
CAP RVS 10
F/R 11
DP CUT 14
VD/CTL 29
DRUM STOP 50
CAP STOP 51
REC P 53
CUE/REV 54
UNLOAD 2 55
REEL LOW 58
REEL FWD 59
REEL STOP 60
REC+C/R 61
Q008,009 SOLENOID DRIVE
Q007,010 SOLENOID DRIVE
Q003,005 SOLENOID DRIVE
Q004,006 SOLENOID DRIVE
Q002
Q001
IC001 LOADING/THREADING MOTOR DRIVE
4 L1
6 L2
02 3
01 7
IC002 TAPE END SENSOR
Q026
Q028
Q025
UNBRK PL(S)
UNBRK PL(H)
PINCH PL(S)
PINCH PL(H)
LOAD M(+)
LOAD M(−)
TOP SENS
END SENS
PM902 BRAKE SOLENOID
PM901 PINCH SOLENOID
M904 LOADING/THREADING MOTOR
M
L902 T COIL SENSOR
L901 S COIL SENSOR
S902 REC PROOF
S904 CASSETTE ON
S901 CASSETTE DOWN
S903 THREADING END
RD-21 BOARD
T REEL ROTATION SENSOR
DP CUT
VD/CTL
DRUM STOP
CAP STOP
REC P
CUE/REV
UNLOAD 2
REEL LOW
REEL FWD
REEL STOP
REC+C/R
MC
REC
REC
(SERVO BLOCK)

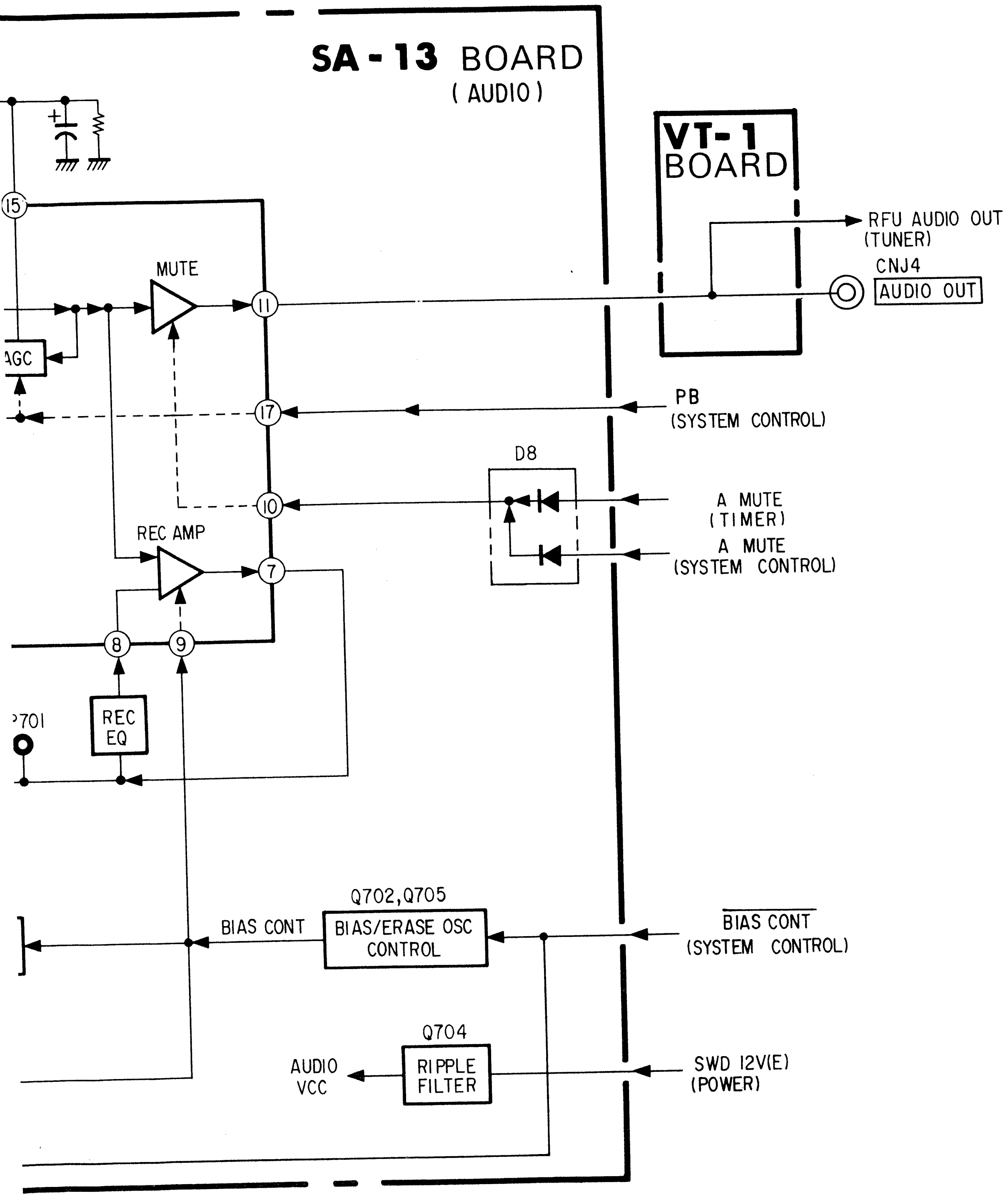

SYSTEM CONTROL
KEY
KEY
EY
KEY
EY
KEY
EY
/TR KEY
/TR LED
ED
LED
LED
RST
ST
D
RDY
TE
NT
P
TE
UN BRK (S) ㉑
UN BRK (H) ㉒
PINCH(S) ㉓
PINCH(H) ㉔
LOAD ⑤
UNLOAD ⑥
T END ⑨
TOP/END ③
REC PRF ⑬
C ON ⑮
C DOWN ⑯
L END ⑰
REEL FG ⑫
S REEL FG ⑱
CAP RVS ⑩
F/R ⑪
DP CUT ⑭
VD/CTL ㉙
DRUM STOP ㊿
CAP STOP (51)
REC P (53)
CUE/REV (54)
UNLOAD 2 (55)
REEL LOW (58)
REEL FWD (59)
REEL STOP (60)
REC+C/R (61)
Q008,009
SOLENOID DRIVE
Q007,010
SOLENOID DRIVE
Q003,005
SOLENOID DRIVE
Q004,006
SOLENOID DRIVE
UNBRK PL(S)
UNBRK PL(H)
PINCH PL(S)
PINCH PL(H)
PM902
BRAKE
SOLENOID
PM901
PINCH
SOLENOID
IC001
LOADING/THREADING
MOTOR DRIVE
Q002
Q001
④ L1
⑥ L2
02 ③
01 ⑦
LOAD M(+)
LOAD M(−)
M
M904
LOADING/THREADING
MOTOR
IC002
TAPE END
SENSOR
①
②
③
④
TOP SENS
END SENS
L902
T COIL
SENSOR
L901
S COIL
SENSOR
S902
REC PROOF
S904
CASSETTE ON
S901
CASSETTE DOWN
S903
THREADING END
RD-21 BOARD
T REEL
ROTATION
SENSOR
DP CUT
VD/CTL
DRUM STOP
CAP STOP
REC P
Q026
CUE/REV
UNLOAD 2
Q028
REEL LOW
REEL FWD
REEL STOP
REC+C/R
MC
REC
Q025
REC
(SERVO BLOCK)

3-14. AUDIO BLOCK DIAGRAM


SA-13 BOARD
(AUDIO)
TUNER AUDIO
(TUNER)
CNJ3
AUDIO IN
VT-1
BOARD
TP702
IC701
18
15
1
2
3
4
11
17
10
7
8
9
AGC
MUTE
PB
EQ
REC AMP
TP705
TP704
AUDIO
HEAD
TP701
REC
EQ
BIAS
TRAP
IC702
RV702
REC BIAS
Q703,T701
BIAS/ERASE
OSC
BIAS CONT
Q702,Q705
BIAS/ERASE OSC
CONTROL
PB
REC
AUDIO
ERASE
HEAD
FULL
ERASE
HEAD
Q704
RIPPLE
FILTER
AUDIO
VCC
VT-1
BOARD
RFU AUDIO OUT
(TUNER)
CNJ4
AUDIO OUT
PB
(SYSTEM CONTROL)
D8
A MUTE
(TIMER)
A MUTE
(SYSTEM CONTROL)
BIAS CONT
(SYSTEM CONTROL)
SWD 12V(E)
(POWER)

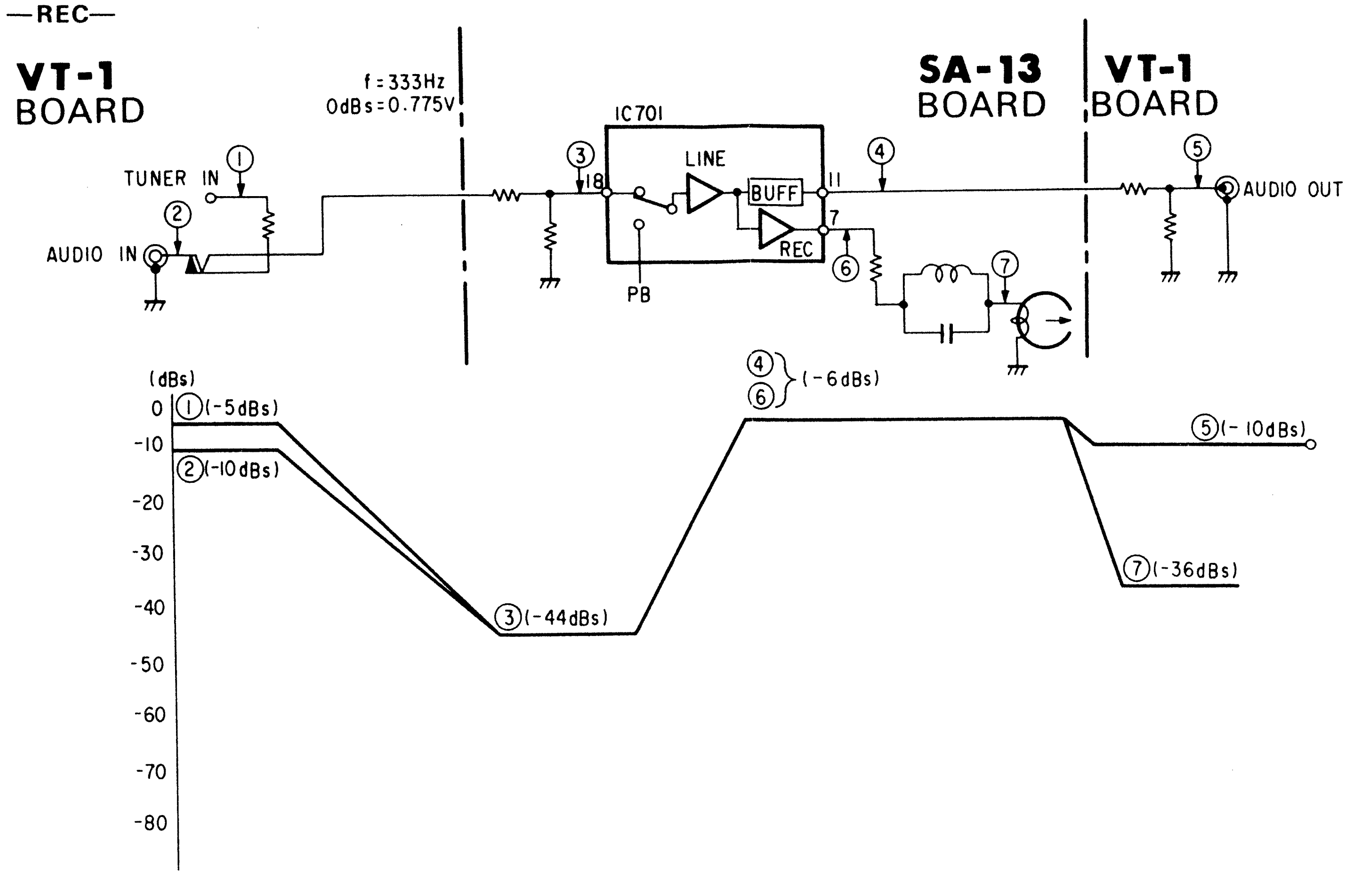
3-15. AUI


—REC—
VT-1
BOARI
AUDIO II
—PB—
(dBs
0
-10
-20
-30
-40
-50
-70
-80

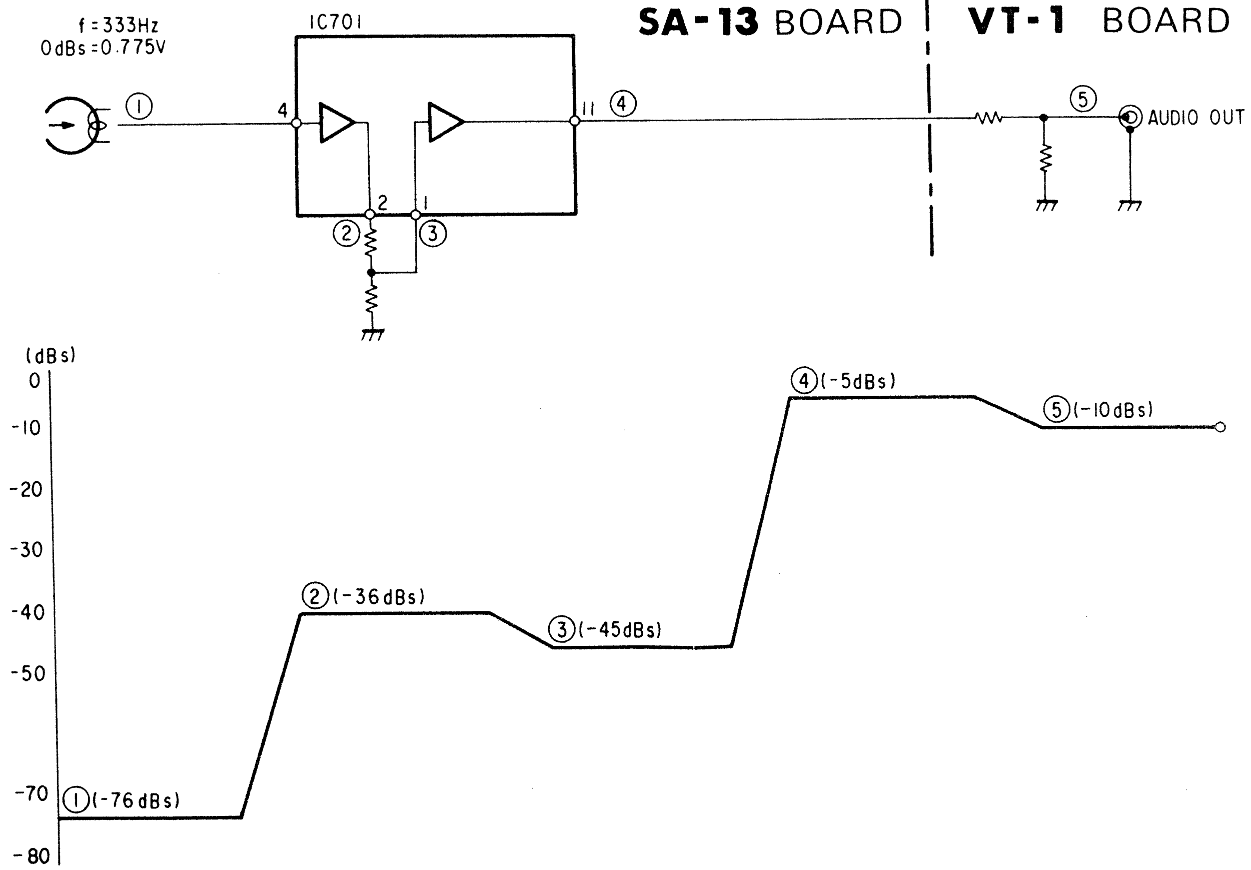

SA-13 BOARD
(AUDIO)
VT-1
BOARD
RFU AUDIO OUT
(TUNER)
CNJ4
AUDIO OUT
MUTE
AGC
PB
(SYSTEM CONTROL)
D8
A MUTE
(TIMER)
A MUTE
(SYSTEM CONTROL)
REC AMP
REC
EQ
Q702,Q705
BIAS CONT
BIAS/ERASE OSC
CONTROL
BIAS CONT
(SYSTEM CONTROL)
Q704
AUDIO
VCC
RIPPLE
FILTER
SWD 12V(E)
(POWER)
⑮
⑪
⑰
⑩
⑦
⑧
⑨

3-15. AUDIO LEVEL DIAGRAM

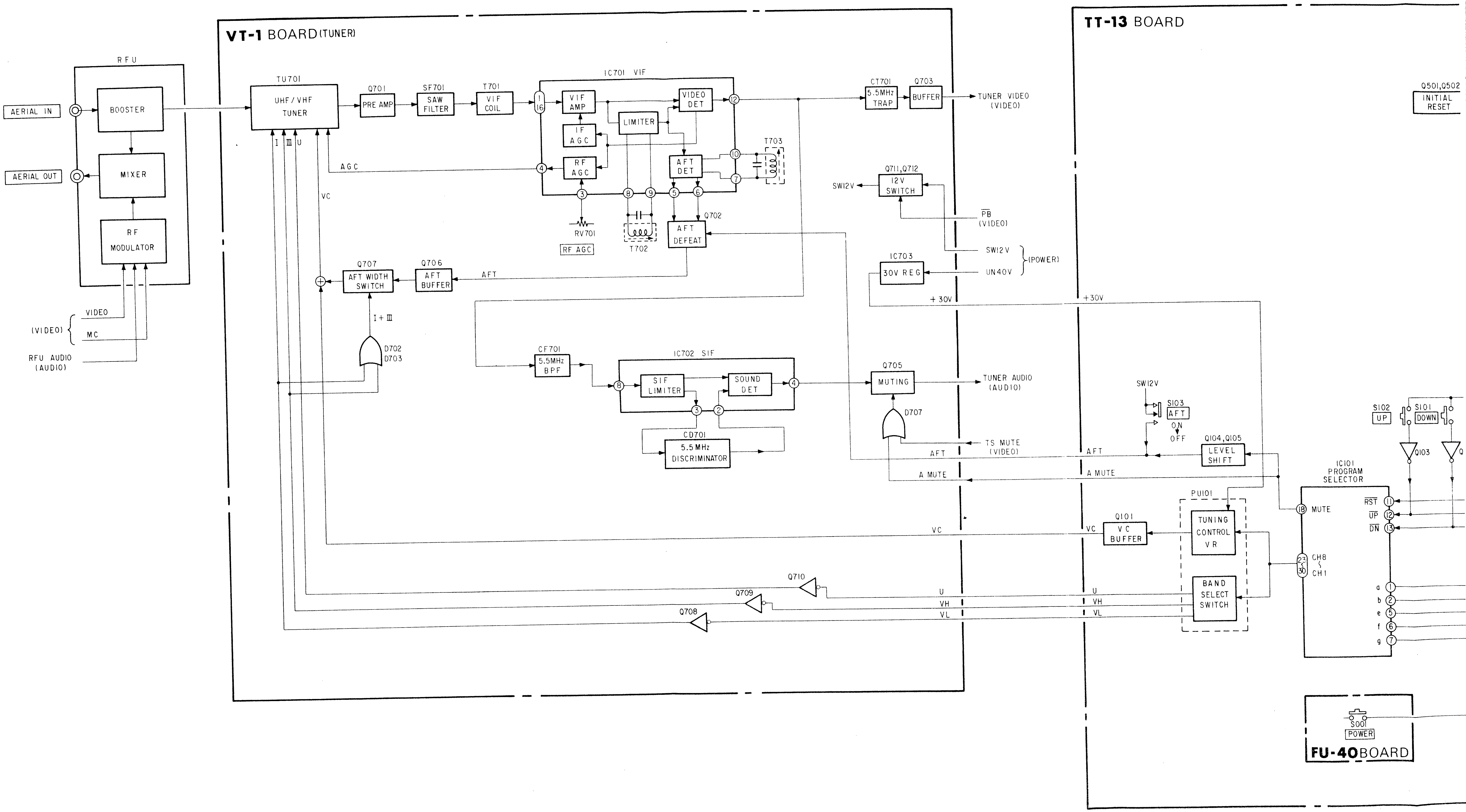
—REC—

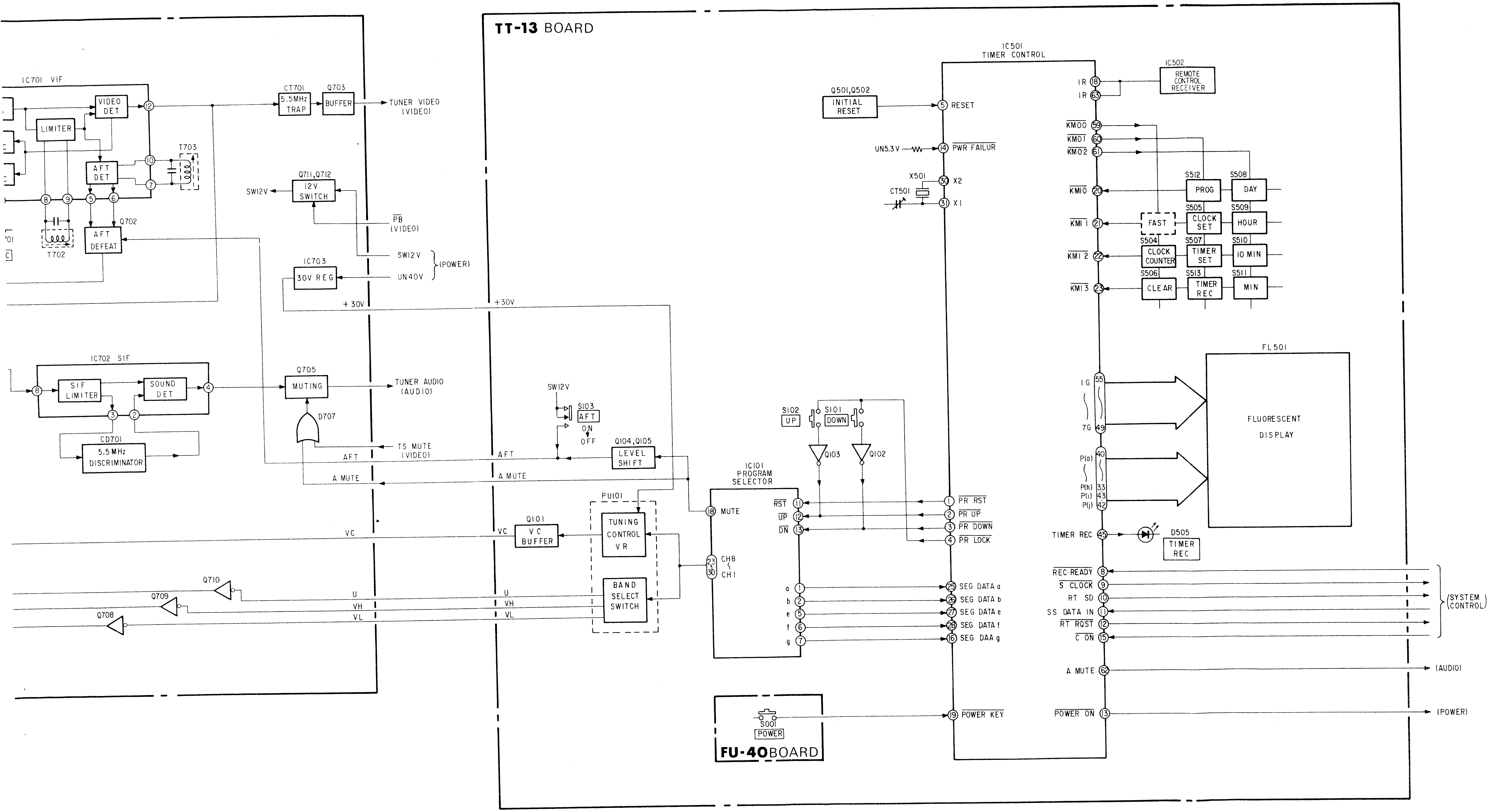

VT-1
BOARD
f=333Hz
0dBs=0.775V
IC701
SA-13
BOARD
VT-1
BOARD
TUNER IN ①
AUDIO IN ②
③
18
LINE
BUFF
REC
PB
11
7
④
⑥
⑦
⑤
AUDIO OUT
(dBs)
0
-10
-20
-30
-40
-50
-60
-70
-80
①(-5dBs)
②(-10dBs)
③(-44dBs)
④ ⑥ (-6dBs)
⑤(-10dBs)
⑦(-36dBs)

—PB—

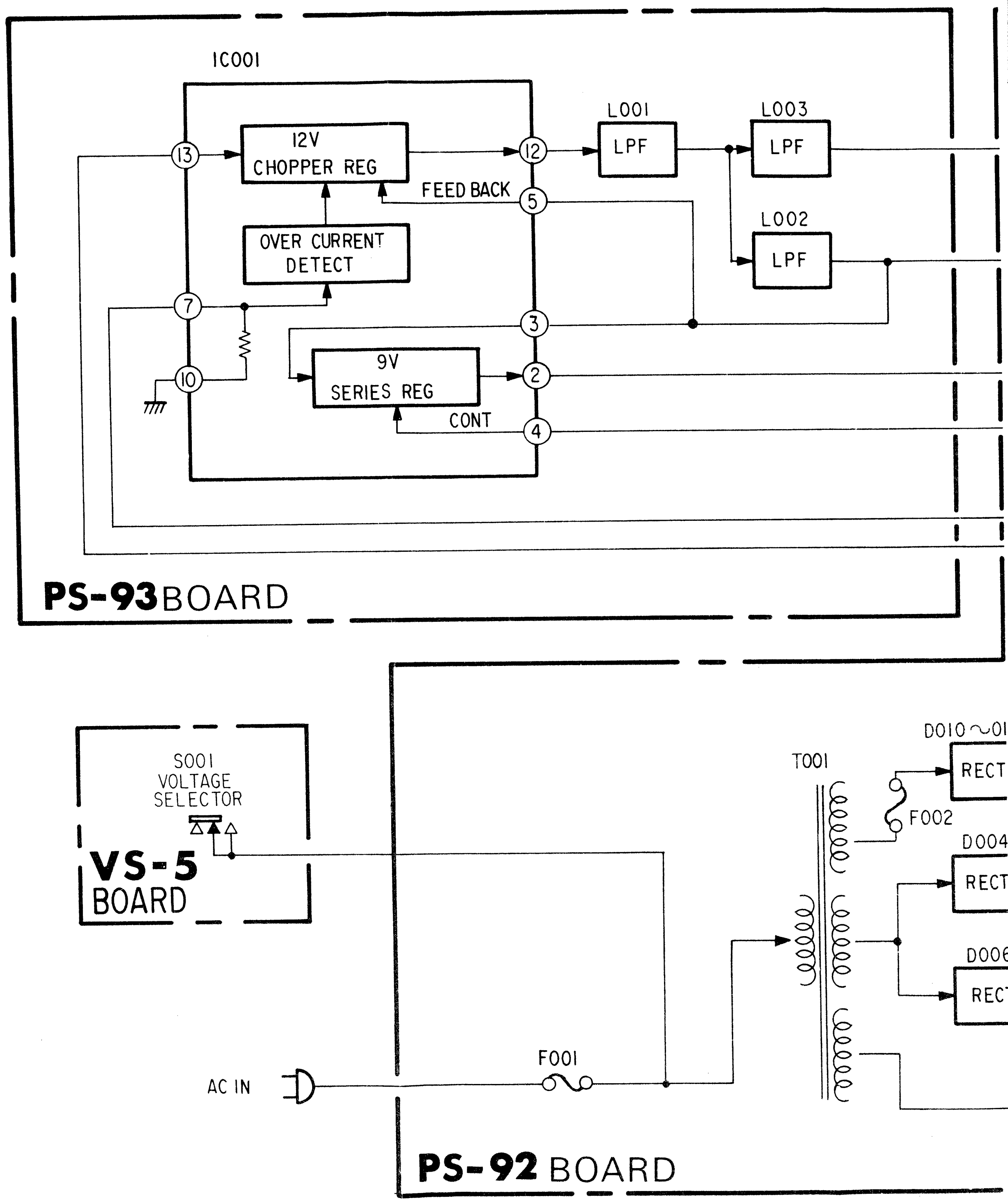

f=333Hz
0dBs=0.775V
IC701
SA-13 BOARD
VT-1 BOARD
①
4
2
1
②
③
11 ④
⑤
AUDIO OUT
(dBs)
0
-10
-20
-30
-40
-50
-70
-80
①(-76dBs)
②(-36dBs)
③(-45dBs)
④(-5dBs)
⑤(-10dBs)

3-16. TUNER, TIMER BLOCK DIAGRAM

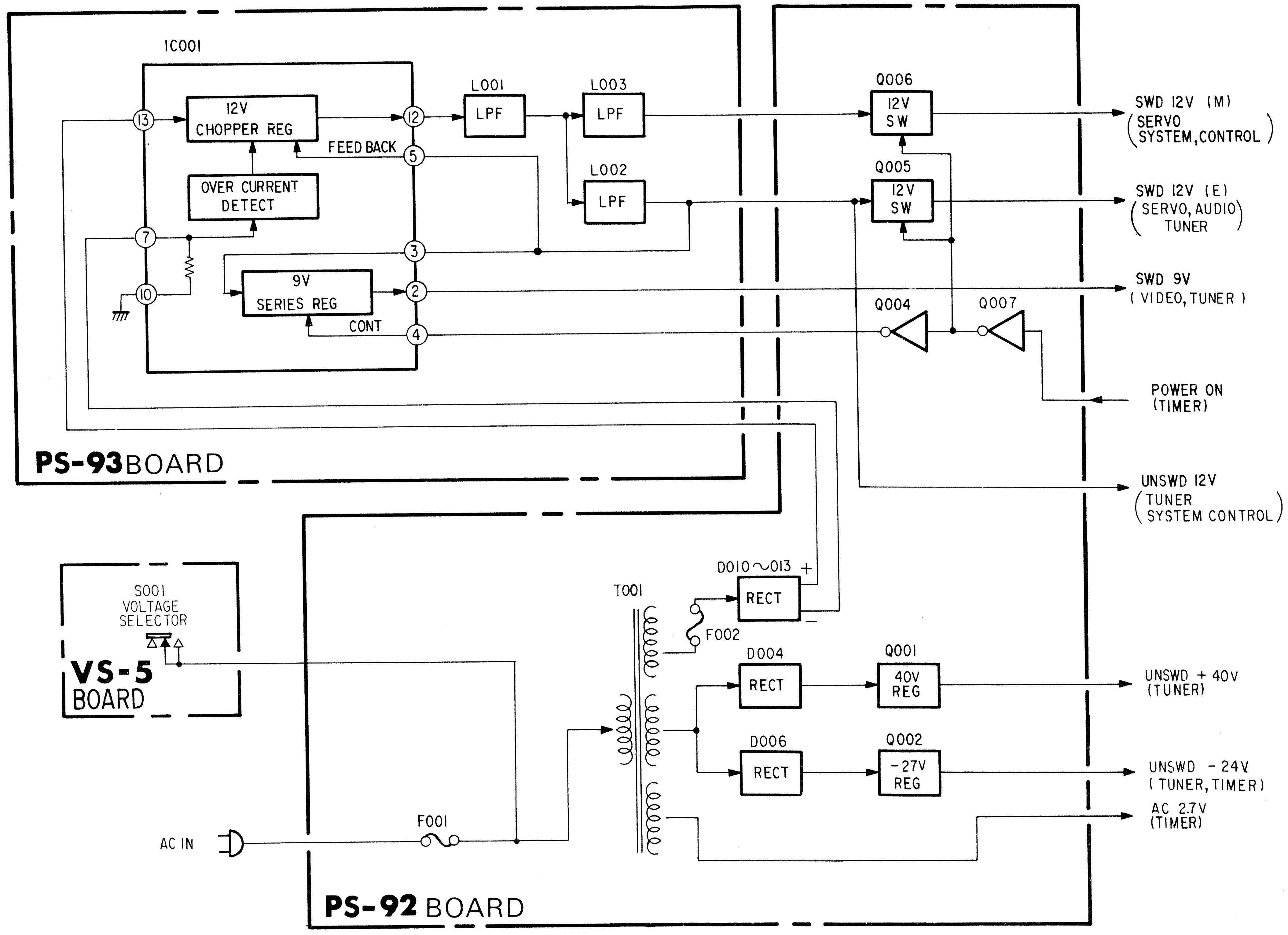

VT-1 BOARD (TUNER)
TT-13 BOARD
FU-40 BOARD
RFU
AERIAL IN
AERIAL OUT
BOOSTER
MIXER
RF MODULATOR
VIDEO
(VIDEO)
MC
RFU AUDIO (AUDIO)
TU701
UHF/VHF TUNER
I Ⅲ U
AGC
VC
Q701 PRE AMP
SF701 SAW FILTER
T701 VIF COIL
IC701 VIF
VIF AMP
IF AGC
RF AGC
LIMITER
VIDEO DET
AFT DET
T703
RV701
RF AGC
T702
Q702
AFT DEFEAT
Q707 AFT WIDTH SWITCH
Q706 AFT BUFFER
AFT
I+Ⅲ
D702
D703
CT701 5.5MHz TRAP
Q703 BUFFER
TUNER VIDEO (VIDEO)
Q711,Q712 12V SWITCH
SW12V
PB (VIDEO)
SW12V
UN40V
(POWER)
IC703 30V REG
+30V
+30V
CF701 5.5MHz BPF
IC702 SIF
SIF LIMITER
SOUND DET
CD701 5.5MHz DISCRIMINATOR
Q705 MUTING
TUNER AUDIO (AUDIO)
D707
TS MUTE (VIDEO)
AFT
A MUTE
VC
Q710
Q709
Q708
U
VH
VL
Q501,Q502 INITIAL RESET
SW12V
S103 AFT
ON
OFF
Q104,Q105 LEVEL SHIFT
S102 UP
S101 DOWN
Q103
IC101 PROGRAM SELECTOR
MUTE
RST
UP
DN
CH8 ~ CH1
a b e f g
PU101
TUNING CONTROL VR
BAND SELECT SWITCH
Q101 VC BUFFER
S001 POWER


TT-13 BOARD
IC701 VIF
VIDEO DET
LIMITER
AFT DET
T703
T702
Q702
AFT DEFEAT
CT701
5.5MHz TRAP
Q703
BUFFER
TUNER VIDEO (VIDEO)
Q711,Q712
12V SWITCH
SW12V
PB (VIDEO)
SW12V
UN40V
(POWER)
IC703
30V REG
+30V
+30V
IC702 SIF
SIF LIMITER
SOUND DET
CD701
5.5 MHz DISCRIMINATOR
Q705
MUTING
TUNER AUDIO (AUDIO)
D707
TS MUTE (VIDEO)
AFT
AFT
A MUTE
A MUTE
VC
VC
Q710
Q709
Q708
U
VH
VL
U
VH
VL
SW12V
S103
AFT
ON
OFF
Q104,Q105
LEVEL SHIFT
Q101
VC BUFFER
PU101
TUNING CONTROL VR
BAND SELECT SWITCH
IC101
PROGRAM SELECTOR
MUTE
CH8
CH1
RST
UP
DN
a
b
e
f
g
S102
UP
S101
DOWN
Q103
Q102
Q501,Q502
INITIAL RESET
UN5.3V
X501
CT501
IC501
TIMER CONTROL
RESET
PWR FAILUR
X2
X1
PR RST
PR UP
PR DOWN
PR LOCK
SEG DATA a
SEG DATA b
SEG DATA e
SEG DATA f
SEG DAA g
POWER KEY
S001
POWER
FU-40 BOARD
IR
IR
IC502
REMOTE CONTROL RECEIVER
KM00
KM01
KM02
KMI0
KMI1
KMI2
KMI3
S512
PROG
S508
DAY
S505
CLOCK SET
S509
HOUR
FAST
S504
CLOCK COUNTER
S507
TIMER SET
S510
10 MIN
S506
CLEAR
S513
TIMER REC
S511
MIN
FL501
FLUORESCENT DISPLAY
1G
7G
P(a)
P(h)
P(i)
P(j)
TIMER REC
D505
TIMER REC
REC·READY
S CLOCK
RT SD
SS DATA IN
RT RQST
C ON
(SYSTEM CONTROL)
A MUTE
(AUDIO)
POWER ON
(POWER)

3-17. POWER SUPPLY BLOCK DIAGRAM


IC001
12V CHOPPER REG
FEED BACK
OVER CURRENT DETECT
9V SERIES REG
CONT
⑬
⑫
⑤
⑦
③
⑩
②
④
L001
LPF
L003
LPF
L002
LPF
PS-93 BOARD
S001 VOLTAGE SELECTOR
VS-5 BOARD
AC IN
F001
T001
F002
D010∼01
RECT
D004
RECT
D006
REC
PS-92 BOARD

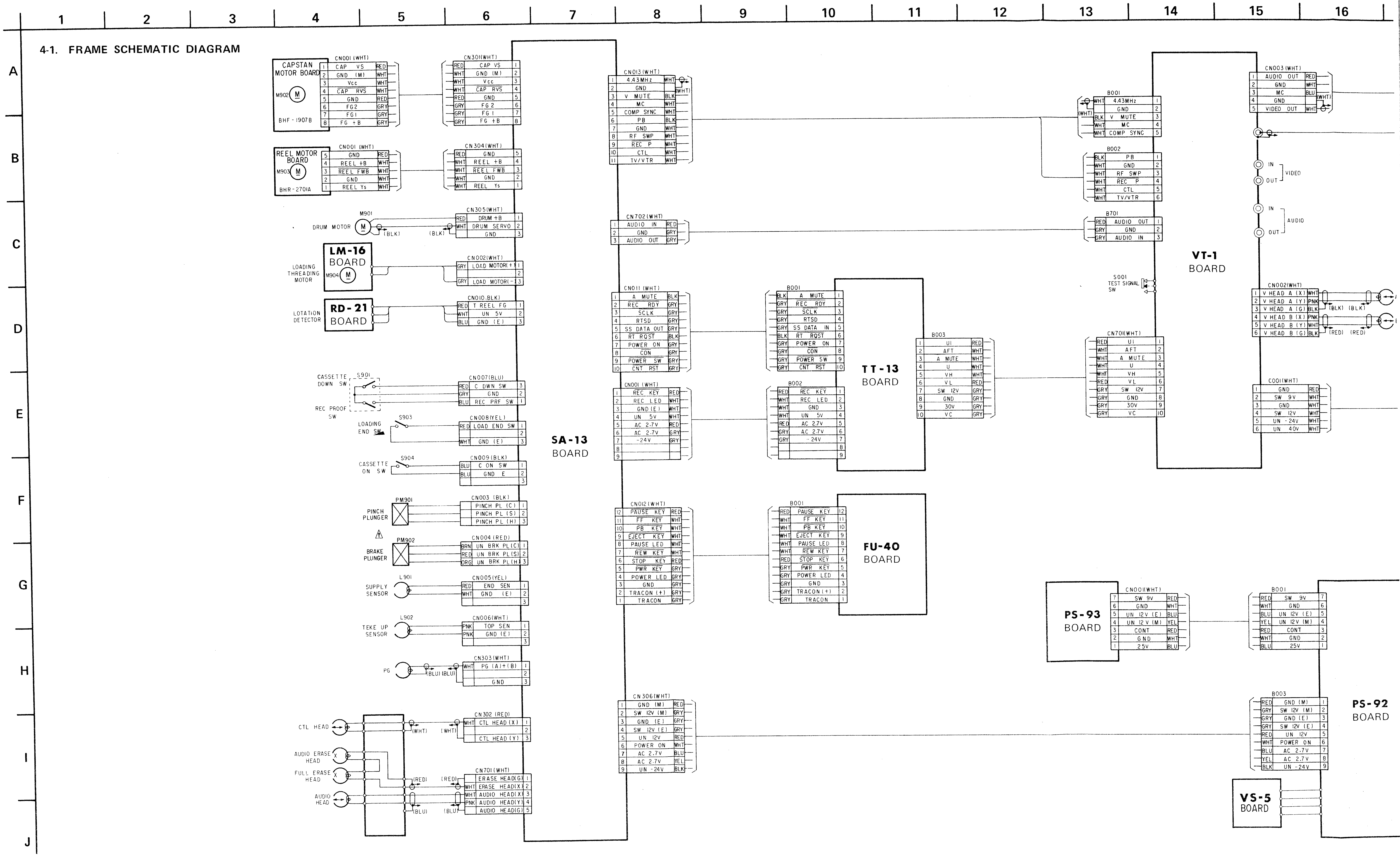
3-17. POWER SUPPLY BLOCK DIAGRAM

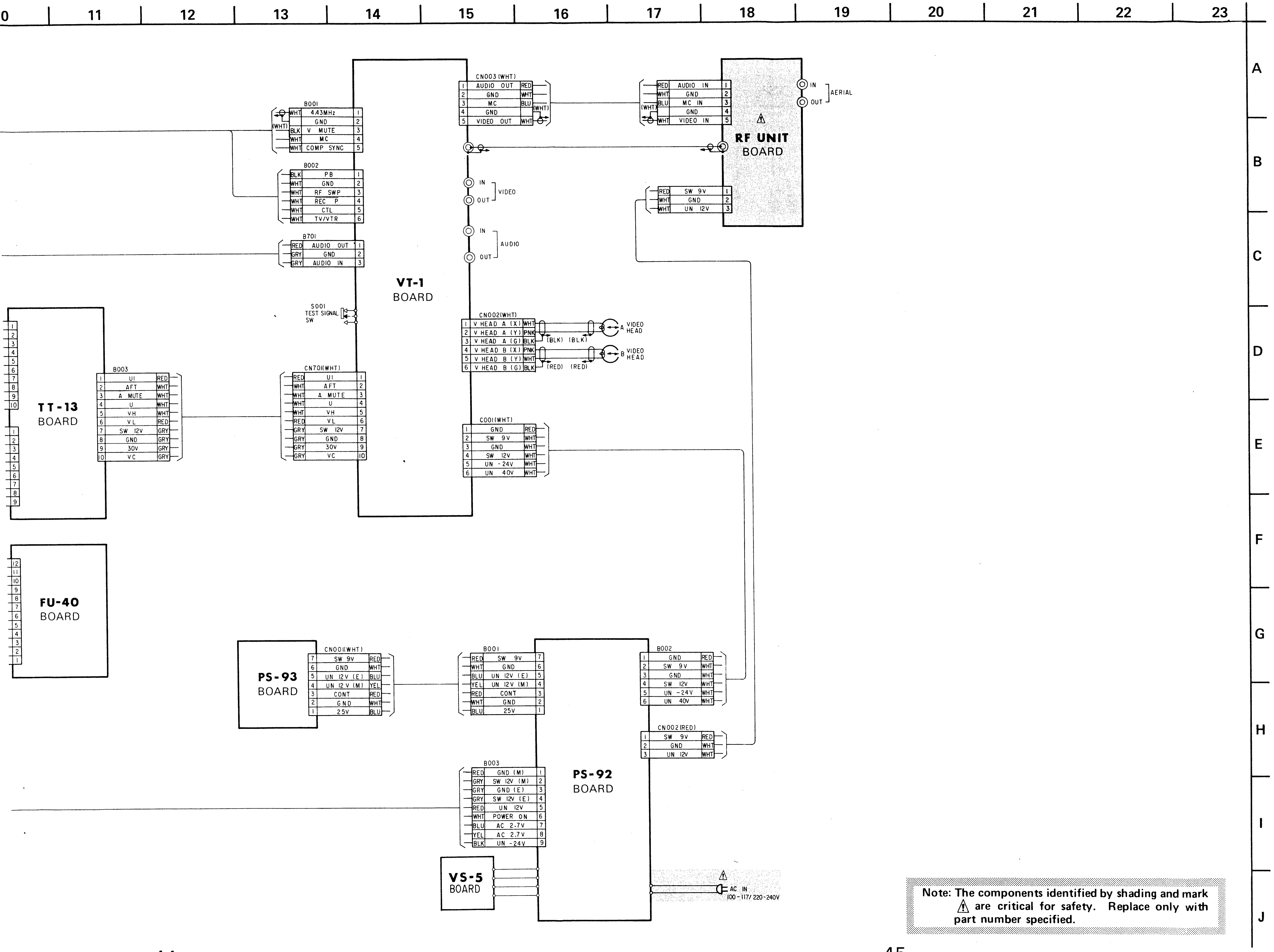

IC001
12V CHOPPER REG
OVER CURRENT DETECT
9V SERIES REG
FEED BACK
CONT
13
12
5
7
3
10
2
4
L001
LPF
L003
LPF
L002
LPF
Q006
12V SW
Q005
12V SW
Q004
Q007
SWD 12V (M)
(SERVO SYSTEM, CONTROL)
SWD 12V (E)
(SERVO, AUDIO TUNER)
SWD 9V
(VIDEO, TUNER)
POWER ON
(TIMER)
UNSWD 12V
(TUNER SYSTEM CONTROL)
PS-93 BOARD
S001
VOLTAGE SELECTOR
VS-5 BOARD
T001
D010~013
+
−
RECT
F002
D004
RECT
Q001
40V REG
D006
RECT
Q002
-27V REG
UNSWD +40V
(TUNER)
UNSWD -24V
(TUNER, TIMER)
AC 2.7V
(TIMER)
F001
AC IN
PS-92 BOARD

SECTION 4

SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

4-1. FRAME SCHEMATIC DIAGRAM


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J
CAPSTAN MOTOR BOARD
M902 M
BHF-1907B
CN001 (WHT)
CAP VS
GND (M)
Vcc
CAP RVS
GND
FG2
FG1
FG +B
REEL MOTOR BOARD
M903 M
BHR-2701A
CN001 (WHT)
GND
REEL +B
REEL FWB
GND
REEL Ys
M901
DRUM MOTOR
(BLK)
LM-16 BOARD
LOADING THREADING MOTOR
M904 M
RD-21 BOARD
LOTATION DETECTOR
CASSETTE DOWN SW
S901
REC PROOF SW
LOADING END SW
S903
CASSETTE ON SW
S904
PINCH PLUNGER
PM901
BRAKE PLUNGER
PM902
SUPPLY SENSOR
L901
TEKE UP SENSOR
L902
PG
(BLU)
CTL HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
AUDIO HEAD
(WHT)
(RED)
CN301 (WHT)
CAP VS
GND (M)
Vcc
CAP RVS
GND
FG2
FG1
FG +B
CN304 (WHT)
GND
REEL +B
REEL FWB
GND
REEL Ys
CN305 (WHT)
DRUM +B
DRUM SERVO
GND
CN002 (WHT)
LOAD MOTOR (+)
LOAD MOTOR (-)
CN010 (BLK)
T REEL FG
UN 5V
GND (E)
CN007 (BLU)
C DWN SW
GND
REC PRF SW
CN008 (YEL)
LOAD END SW
GND (E)
CN009 (BLK)
C ON SW
GND E
CN003 (BLK)
PINCH PL (C)
PINCH PL (S)
PINCH PL (H)
CN004 (RED)
UN BRK PL (C)
UN BRK PL (S)
UN BRK PL (H)
CN005 (YEL)
END SEN
GND (E)
CN006 (WHT)
TOP SEN
GND (E)
CN303 (WHT)
PG (A)+(B)
GND
CN302 (RED)
CTL HEAD (X)
CTL HEAD (Y)
CN701 (WHT)
ERASE HEAD (G)
ERASE HEAD (X)
AUDIO HEAD (X)
AUDIO HEAD (Y)
AUDIO HEAD (G)
SA-13 BOARD
CN013 (WHT)
4.43MHz
GND
V MUTE
MC
COMP SYNC
PB
GND
RF SWP
REC P
CTL
TV/VTR
CN702 (WHT)
AUDIO IN
GND
AUDIO OUT
CN011 (WHT)
A MUTE
REC RDY
SCLK
RTSD
SS DATA OUT
RT RQST
POWER ON
CON
POWER SW
CNT RST
CN001 (WHT)
REC KEY
REC LED
GND (E)
UN 5V
AC 2.7V
AC 2.7V
-24V
CN012 (WHT)
PAUSE KEY
FF KEY
PB KEY
EJECT KEY
PAUSE LED
REW KEY
STOP KEY
PWR KEY
POWER LED
GND
TRACON (+)
TRACON
CN306 (WHT)
GND (M)
SW 12V (M)
GND (E)
SW 12V (E)
UN 12V
POWER ON
AC 2.7V
AC 2.7V
UN -24V
TT-13 BOARD
B001
A MUTE
REC RDY
SCLK
RTSD
SS DATA IN
RT RQST
POWER ON
CON
POWER SW
CNT RST
B002
REC KEY
REC LED
GND
UN 5V
AC 2.7V
AC 2.7V
-24V
B003
UI
AFT
A MUTE
U
VH
VL
SW 12V
GND
30V
VC
FU-40 BOARD
B001
PAUSE KEY
FF KEY
PB KEY
EJECT KEY
PAUSE LED
REW KEY
STOP KEY
PWR KEY
POWER LED
GND
TRACON (+)
TRACON
VT-1 BOARD
B001
4.43MHz
GND
V MUTE
MC
COMP SYNC
B002
PB
GND
RF SWP
REC P
CTL
TV/VTR
B701
AUDIO OUT
GND
AUDIO IN
S001
TEST SIGNAL SW
CN701 (WHT)
UI
AFT
A MUTE
U
VH
VL
SW 12V
GND
30V
VC
CN003 (WHT)
AUDIO OUT
GND
MC
GND
VIDEO OUT
IN
OUT
VIDEO
IN
OUT
AUDIO
CN002 (WHT)
V HEAD A (X)
V HEAD A (Y)
V HEAD A (G)
V HEAD B (X)
V HEAD B (Y)
V HEAD B (G)
(BLK) (BLK)
(RED) (RED)
C001 (WHT)
GND
SW 9V
GND
SW 12V
UN -24V
UN 40V
PS-93 BOARD
CN001 (WHT)
SW 9V
GND
UN 12V (E)
UN 12V (M)
CONT
GND
25V
PS-92 BOARD
B001
SW 9V
GND
UN 12V (E)
UN 12V (M)
CONT
GND
25V
B003
GND (M)
SW 12V (M)
GND (E)
SW 12V (E)
UN 12V
POWER ON
AC 2.7V
AC 2.7V
UN -24V
VS-5 BOARD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A
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H
I
J
VT-1 BOARD
RF UNIT BOARD
TT-13 BOARD
FU-40 BOARD
PS-93 BOARD
PS-92 BOARD
VS-5 BOARD
B001
4.43MHz
GND
V MUTE
MC
COMP SYNC
(WHT)
B002
PB
GND
RF SWP
REC P
CTL
TV/VTR
B701
AUDIO OUT
GND
AUDIO IN
S001 TEST SIGNAL SW
CN003 (WHT)
AUDIO OUT
GND
MC
GND
VIDEO OUT
AUDIO IN
MC IN
VIDEO IN
IN
OUT
AERIAL
VIDEO
AUDIO
SW 9V
GND
UN 12V
CN002(WHT)
V HEAD A (X)
V HEAD A (Y)
V HEAD A (G)
V HEAD B (X)
V HEAD B (Y)
V HEAD B (G)
(BLK) (BLK)
(RED) (RED)
A VIDEO HEAD
B VIDEO HEAD
B003
CN701(WHT)
UI
AFT
A MUTE
U
VH
VL
SW 12V
GND
30V
VC
C001(WHT)
SW 9V
SW 12V
UN -24V
UN 40V
CN001(WHT)
UN 12V (E)
UN 12 V (M)
CONT
25V
B001
B002
CN002(RED)
B003
GND (M)
SW 12V (M)
GND (E)
SW 12V (E)
UN 12V
POWER ON
AC 2.7V
UN -24V
AC IN
100 - 117/ 220-240V
RED
WHT
BLU
BLK
GRY
YEL
PNK

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

FRAME **FRAME**

FRAME

19 20 21 22 23

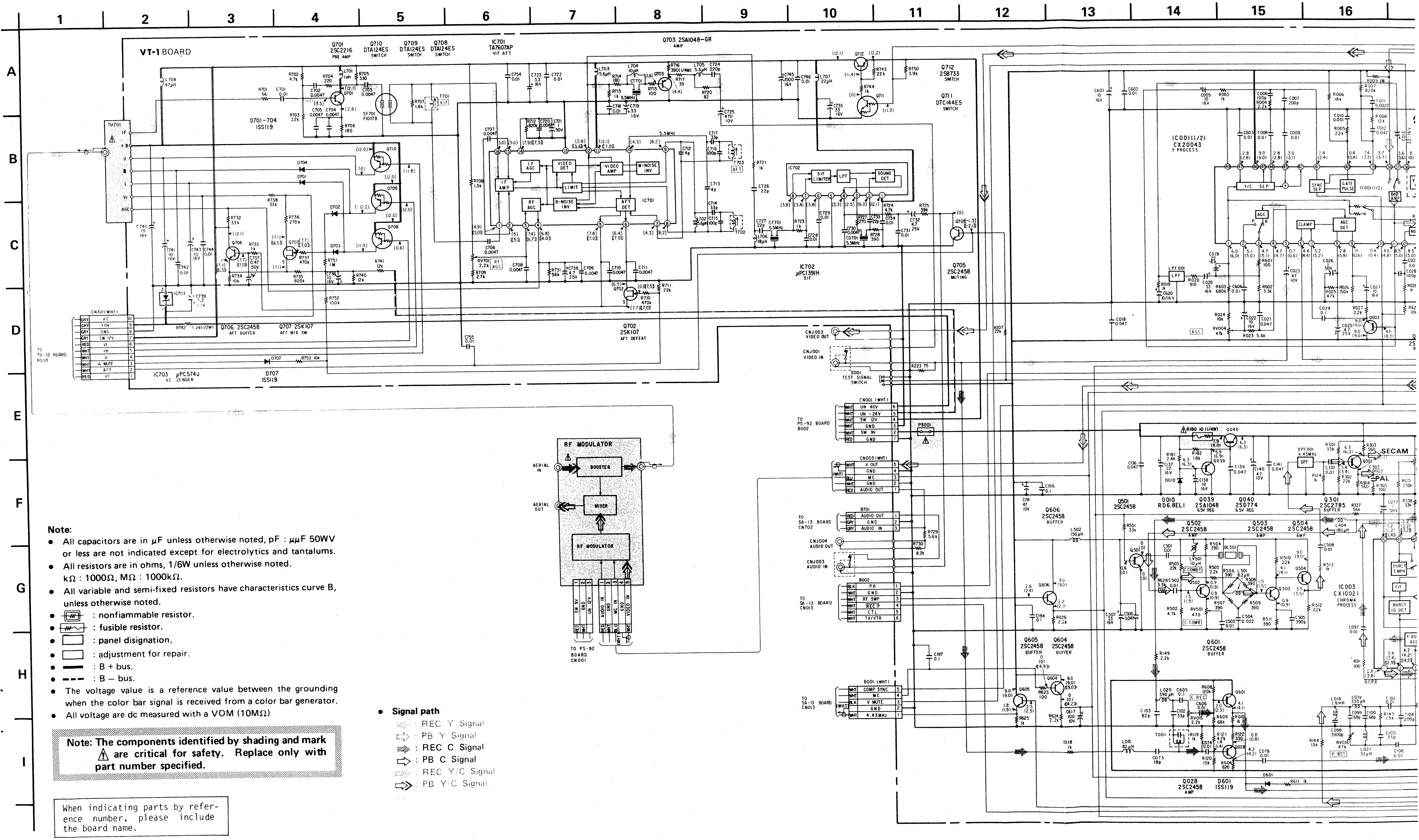
ERIAL

A
B
C
D
E
F
G
H
I
J

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

4-2. VT-1 (VIDEO SIGNAL PROCESS, TUNER) SCHEMATIC DIAGRAM

– Ref. No. VT-1 BOARD: 1,000 series –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A
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D
E
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G
H
I
VT-1 BOARD
TU701
Q701 2SC2216 PRE AMP
Q710 DTA124ES SWITCH
Q709 DTA124ES SWITCH
Q708 DTA124ES SWITCH
IC701 TA7607AP VIF AFT
Q703 2SA1048-GR AMP
Q712 2SB733 SWITCH
Q711 DTC144ES SWITCH
IC001(1/2) CX20043 Y PROCESS
D701-704 1SS119
SF701 F1037B
IF AGC
VIDEO DET
VIDEO AMP
W-NOISE INV
IF AMP
LIMIT
RF AGC
B-NOISE INV
AFT DET
IC702
SIF LIMITER
LPF
SOUND DET
IC702 μPC1391H SIF
Q705 2SC2458 MUTING
Q702 2SK107 AFT DEFEAT
Q706 2SC2458 AFT BUFFER
Q707 2SK107 AFT MIX SW
IC703 μPC574J VC ZENDER
D707 1SS119
CN701 (WHT)
TO TU-13 BOARD R003
Y/C SEP
SYNC SEP
GATE PULSE
AGC
CLAMP
AGC DET
CNJ002 VIDEO OUT
CNJ001 VIDEO IN
S001 TEST SIGNAL SWITCH
CN001 (WHT)
TO PS-92 BOARD B002
PS001
CN003 (WHT)
B701
TO SA-13 BOARD CN702
CNJ004 AUDIO OUT
CNJ003 AUDIO IN
B002
TO SA-13 BOARD CN013
B001 (WHT)
TO SA-13 BOARD CN013
RF MODULATOR
AERIAL IN
BOOSTER
AERIAL OUT
MIXER
RF MODULATOR
TO PS-92 BOARD CN001
Q040
Q039 2SA1048 6.5V REG
Q040 2SD774 6.5V REG
D010 RD6.8EL1
Q501 2SC2458
Q606 2SC2458 BUFFER
Q502 2SC2458 AMP
Q503 2SC2458 AMP
Q504 2SC2458 AMP
Q301 2SC2785 BUFFER
SECAM
PAL
IC003 CX10021 CHROMA PROCESS
Q605 2SC2458 BUFFER
Q604 2SC2458 BUFFER
Q601 2SC2458 BUFFER
Q028 2SC2458 AMP
D601 1SS119

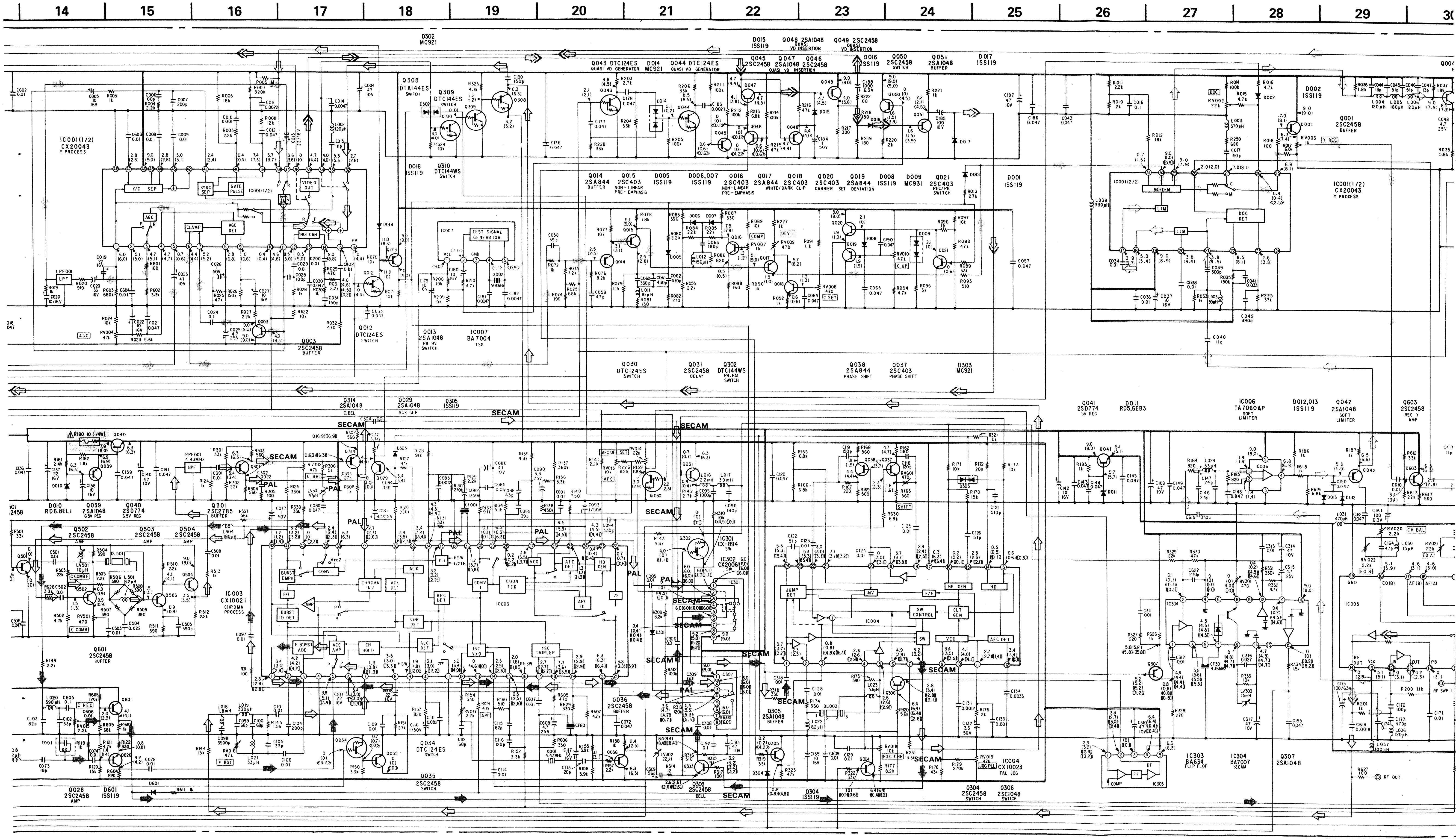
Note:

- All capacitors are in μF unless otherwise noted, pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/6W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ.
- All variable and semi-fixed resistors have characteristics curve B, unless otherwise noted.
- : nonfiammable resistor.
- : fusible resistor.
- ☐ : panel disignation.
- ☐ : adjustment for repair.
- ━━ : B + bus.
- - - - : B – bus.
- The voltage value is a reference value between the grounding when the color bar signal is received from a color bar generator.
- All voltage are dc measured with a VOM (10MΩ)

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- **Signal path**
  - ⇨ : REC Y Signal
  - ⇨ : PB Y Signal
  - ➡ : REC C Signal
  - ⇨ : PB C Signal
  - ⇨ : REC Y/C Signal
  - ⇨ : PB Y/C Signal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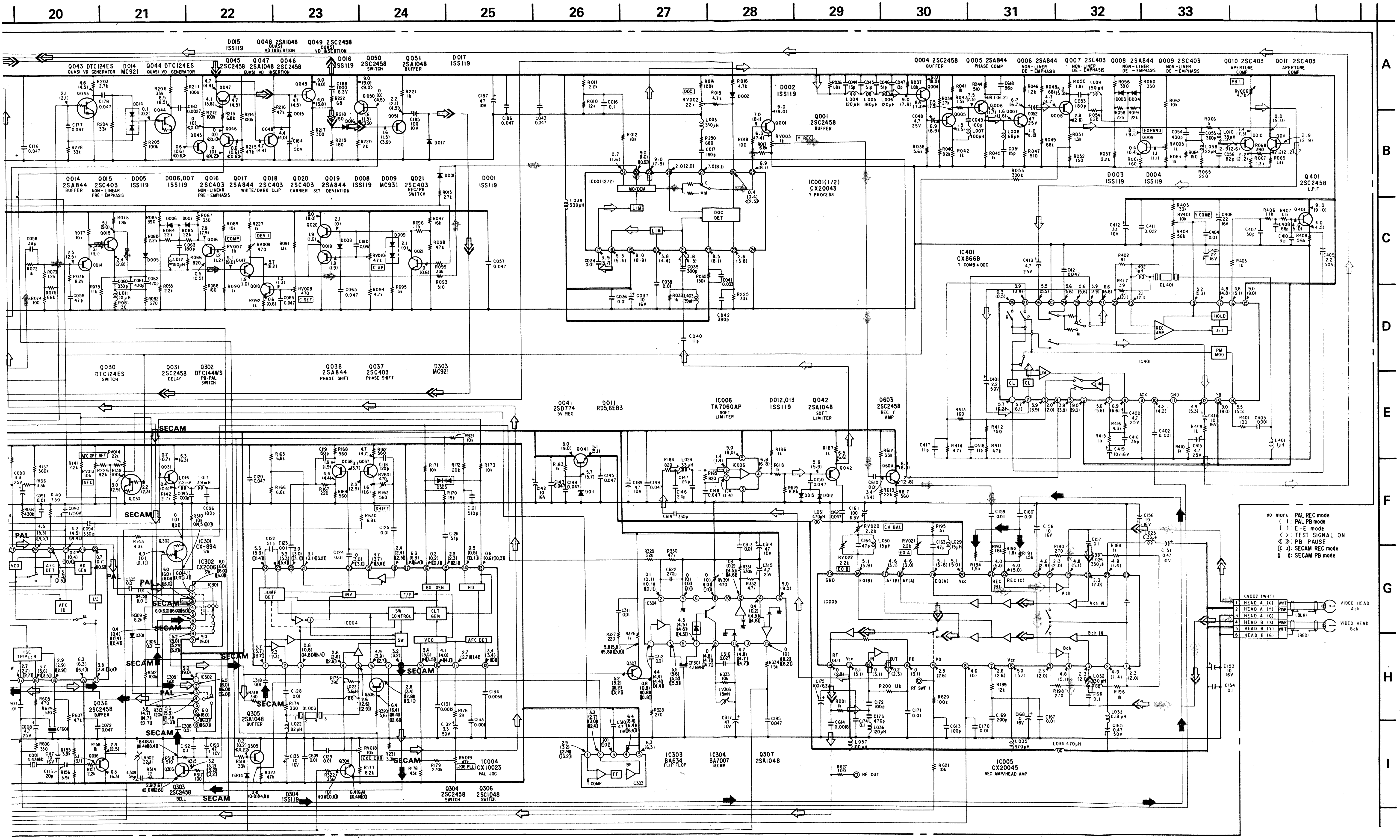
IC001(1/2) CX20043 Y PROCESS
Y/C SEP
SYNC SEP
GATE PULSE
VIDEO OUT
AGC
CLAMP
AGC DET
NOISE CAN
LPF001
D302 MC921
Q308 DTA144ES SWITCH
Q309 DTC144ES SWITCH
Q310 DTC144WS SWITCH
D018 ISS119
IC007 BA7004 TSG
TEST SIGNAL GENERATOR
Q013 2SA1048 PB 9V SWITCH
Q012 DTC124ES SWITCH
Q003 2SC2458 BUFFER
Q043 DTC124ES QUASI VD GENERATOR
D014 MC921
Q044 DTC124ES QUASI VD GENERATOR
D015 ISS119
Q045 2SC2458
Q048 2SA1048 QUASI VD INSERTION
Q047 2SA1048 QUASI VD INSERTION
Q046 2SC2458
Q049 2SC2458 QUASI VD INSERTION
D016 ISS119
Q050 2SC2458 SWITCH
Q051 2SA1048 BUFFER
D017 ISS119
Q014 2SA844 BUFFER
Q015 2SC403 NON-LINEAR PRE-EMPHASIS
D005 ISS119
D006,007 ISS119
Q016 2SC403 NON-LINEAR PRE-EMPHASIS
Q017 2SA844 WHITE/DARK CLIP
Q018 2SC403
Q020 2SC403 CARRIER SET
Q019 2SA844 DEVIATION
D008 ISS119
D009 MC931
Q021 2SC403 REC/PB SWITCH
D001 ISS119
COMP
DEV
C SET
C UP
Q030 DTC124ES SWITCH
Q031 2SC2458 DELAY
Q302 DTC144WS PB-PAL SWITCH
Q038 2SA844 PHASE SHIFT
Q037 2SC403 PHASE SHIFT
D303 MC921
IC001(2/2)
MO/DEM
LIM
DOC DET
IC001(1/2) CX20043 Y PROCESS
Q001 2SC2458 BUFFER
D002 ISS119
Y REC
DOC
Q314 2SA1048 C.BEL
Q029 2SA1048 ACK SLP
Q305 ISS119
SECAM
PAL
Q040 2SD774 6.5V REG
Q039 2SA1048 6.5V REG
D010 RD6.8EL1
Q301 2SC2785 BUFFER
BPF001 4.43MHz
Q502 2SC2458 AMP
Q503 2SC2458 AMP
Q504 2SC2458 AMP
C COMB
IC003 CX10021 CHROMA PROCESS
BURST EMPH
CONV
CHROMA INV
ACK DET
P.I.
HSW
COUNTER
AFC DET
HD GEN
APC DET
APC ID
BURST ID DET
P. BURST ADD
ACC AMP
CH HOLD
KILLER DET
ACC DET
VXO
TRIPLER
Q601 2SC2458 BUFFER
C REC
Q028 2SC2458 AMP
D601 ISS119
Q034 DTC124ES SWITCH
Q035 2SC2458 SWITCH
Q036 2SC2458 BUFFER
Q303 2SC2458 BELL
IC301 CX-894 SW
IC302 CX2006
P BST
AFC DET SET
AFC
Q305 2SA1048 BUFFER
D304 ISS119
Q304 2SC2458 SWITCH
Q306 2SC1048 SWITCH
IC004 CX10023 PAL JOG
JUMP DET
INV
F/F
BG GEN
HD
SW CONTROL
CLT GEN
VCO
AFC DET
EXC CHR
JOG PLL
SHIFT
Q041 2SD774 5V REG
D011 RD5.6EB3
IC006 TA7060AP SOFT LIMITER
D012,013 ISS119
Q042 2SA1048 SOFT LIMITER
Q603 2SC2458 REC Y AMP
IC303 BA634 FLIP FLOP
IC304 BA7007 SECAM
Q307 2SA1048
IC005
CH BAL
E0.A
E0.B
RF OUT
R200 1k
RF SWP
COMP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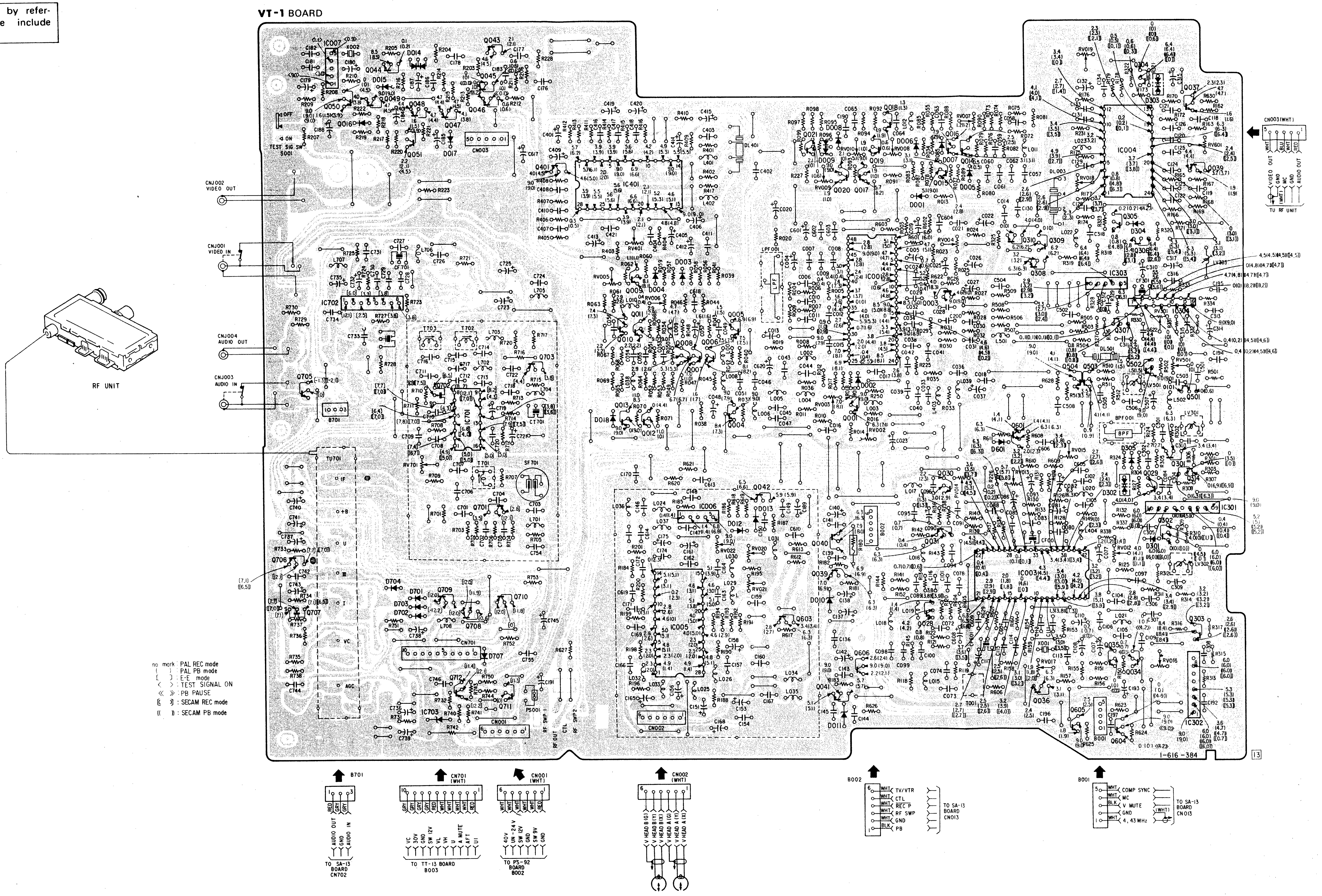
I
D015 1SS119
Q048 2SA1048 QUASI VD INSERTION
Q049 2SC2458 QUASI VD INSERTION
Q043 DTC124ES QUASI VD GENERATOR
D014 MC921
Q044 DTC124ES QUASI VD GENERATOR
Q045 2SC2458
Q047 2SA1048 QUASI VD INSERTION
Q046 2SC2458
D016 1SS119
Q050 2SC2458 SWITCH
Q051 2SA1048 BUFFER
D017 1SS119
Q004 2SC2458 BUFFER
Q005 2SA844 PHASE COMP
Q006 2SA844 NON-LINER DE-EMPHASIS
Q007 2SC403 NON-LINER DE-EMPHASIS
Q008 2SA844 NON-LINER DE-EMPHASIS
Q009 2SC403 NON-LINER DE-EMPHASIS
Q010 2SC403 APERTURE COMP
Q011 2SC403 APERTURE COMP
D002 1SS119
Q001 2SC2458 BUFFER
Q014 2SA844 BUFFER
Q015 2SC403 NON-LINEAR PRE-EMPHASIS
D005 1SS119
D006,007 1SS119
Q016 2SC403 NON-LINEAR PRE-EMPHASIS
Q017 2SA844 WHITE/DARK CLIP
Q018 2SC403
Q020 2SC403 CARRIER SET
Q019 2SA844 DEVIATION
D008 1SS119
D009 MC931
Q021 2SC403 REC/PB SWITCH
D001 1SS119
IC001(2/2)
IC001(1/2) CX20043 Y PROCESS
MOD/DEM
LIM
DOC DET
D003 1SS119
D004 1SS119
Q401 2SC2458 L.P.F
IC401 CX866B Y COMB & DOC
REC AMP
HOLD
DET
PM MOD
CL
LIM
Q030 DTC124ES SWITCH
Q031 2SC2458 DELAY
Q302 DTC144WS PB-PAL SWITCH
Q038 2SA844 PHASE SHIFT
Q037 2SC403 PHASE SHIFT
D303 MC921
Q041 2SD774 5V REG
D011 RD5.6EB3
IC006 TA7060AP SOFT LIMITER
D012,013 1SS119
Q042 2SA1048 SOFT LIMITER
Q603 2SC2458 REC Y AMP
SECAM
PAL
AFC OFF SET
AFC
VCO
AFC DET
HD GEN
APC ID
1/2
ISC TRIPLER
IC301 CX-894 SW
IC302 CX2006 SW
JUMP DET
INV
F/F
BG GEN
HD
SW CONTROL
CLT GEN
SW
VCO
AFC DET
IC004
SHIFT
EXC CHR
JOG PLL
CH BAL
E0 B
E0 A
GND
E0(B)
AF(B)
AF(A)
E0(A)
Vcc
REC (B)
REC (C)
Ach
Ach IN
Bch
Bch IN
RF OUT
PB
PG
IC005
RF SWP
Q036 2SC2458 BUFFER
Q305 2SA1048 BUFFER
Q303 2SC2458 BELL
D304 1SS119
Q304 2SC2458 SWITCH
Q306 2SC1048 SWITCH
IC004 CX10023 PAL JOG
IC303 BA634 FLIP FLOP
IC304 BA7007 SECAM
Q307 2SA1048
COMP
FF
BF
IC005 CX20045 REC AMP/HEAD AMP
RF OUT
no mark : PAL REC mode
( ) : PAL PB mode
〔 〕: E-E mode
< > : TEST SIGNAL ON
《 》: PB PAUSE
[( )]: SECAM REC mode
(( )): SECAM PB mode
CN002 (WHT)
1 HEAD A (X) WHT
2 HEAD A (Y) PINK
3 HEAD A (G) (BLK)
4 HEAD B (X) PINK
5 HEAD B (Y) WHT
6 HEAD B (G) (RED)
VIDEO HEAD Ach
VIDEO HEAD Bch

VT-1 (VIDEO SIGNAL PROCESS, TUNER) PRINTED WIRING BOARD

– Ref. No. VT-1 BOARD: 1,000 series –

When indicating parts by reference number, please include the board name.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A
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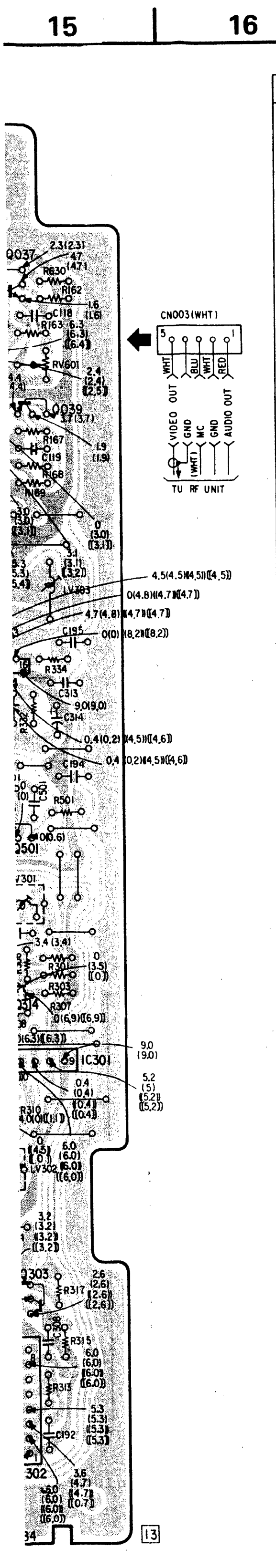
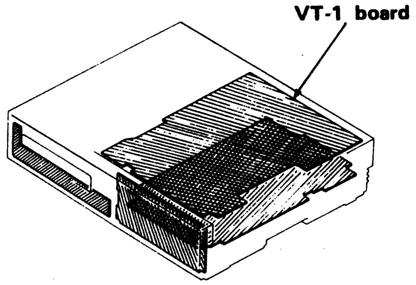
C
D
E
F
G
H
I
J
VT-1 BOARD
CNJ002 VIDEO OUT
CNJ001 VIDEO IN
CNJ004 AUDIO OUT
CNJ003 AUDIO IN
RF UNIT
TEST SIG SW S001
OFF
ON
IC007
IC401
IC004
IC303
IC301
IC302
IC003
IC005
IC006
IC701
IC702
IC703
TU701
SF701
CN003
CN701
CN001
CN002
B701
B001
B002
DL401
DL001
RF SWP 1
RF OUT
CTL
RF SWP 2
1-616-384
CN003 (WHT)
VIDEO OUT
GND
GND
AUDIO OUT
TO TU RF UNIT
B701
RED
GRY
GRY
AUDIO OUT
GND
AUDIO IN
TO SA-13 BOARD CN702
CN701 (WHT)
GRY
GRY
GRY
GRY
RED
WHT
WHT
WHT
WHT
RED
VC
30V
GND
SW 12V
VL
VH
U
A MUTE
AFT
UI
TO TT-13 BOARD B003
CN001 (WHT)
WHT
WHT
WHT
WHT
WHT
RED
40V
UN -24 V
SW 12V
GND
SW 9V
GND
TO PS-92 BOARD B002
CN002 (WHT)
V HEAD B (G)
V HEAD B (Y)
V HEAD B (X)
V HEAD A (G)
V HEAD A (Y)
V HEAD A (X)
B002
WHT TV/VTR
WHT CTL
WHT REC P
WHT RF SWP
WHT GND
BLK PB
TO SA-13 BOARD CN013
B001
WHT COMP SYNC
WHT MC
BLK V MUTE
GND
WHT 4, 43 MHz
(WHT)
TO SA-13 BOARD CN013

no mark : PAL REC mode
( ) : PAL PB mode
[ ] : E-E mode
< > : TEST SIGNAL ON
« » : PB PAUSE
〚 〛 : SECAM REC mode
(( )) : SECAM PB mode

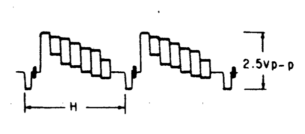


Q , IC	D	ADJ
043		RV019
IC007		
044	014	
	015	
304		
050,045,046,037	303	
049		
048,047,018		
	016	RV007
051		
	017	
021,019,016,014	009,008,006,	RV601
IC004	007	RV010 RV008
401, IC401		
020,017,015,038	005	RV009
		RV018
	001	
305	304	
		RV401
310,309		RV004
306		
308		
009	004,003	RV005
IC303		
003		RV006
IC702 ,IC001		
IC304		
010,011,005		
307		RV301
008,007,006		
703 502		RV501
504,503	002	
705		
702 501		RV003
IC701 001		
004,		
013,012	018	
601	601	RV002
	305	
301		RV015
		RV701
314		RV014,
030,029	302	RV013
042		
701		
IC006		
IC301	013	
031	012	
040,302	301	RV022
		RV020
706		RV012
039,IC003		
	704	RV021
	701	
709,710	703,010	
707 028	702	
708,603		
IC005,303		
606,035,034	707	RV016
		RV017
712,711		
041,036		
IC703		
IC302	011	
605,604		
Q , IC	D	ADJ

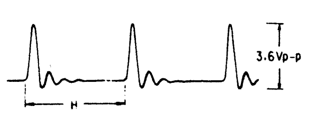
- ○— : Indicates a leadwire mounted on the component side.
- ●— : Indicates a leadwire mounted on the printed side.
- ░ : soldering side.
- ░ : B+ pattern.
- Digital transistor (VT-1: Q012, 030, 034, 043, 044, 302, 308, 309, 310, 708, 709, 710, 711) transistor with resistors. Refer to the VT-1 board schematic diagram for digital transistor.



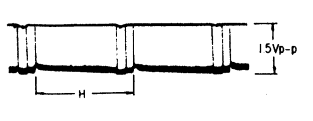
VT-1 BOARD



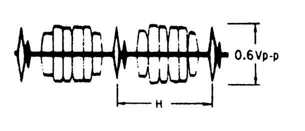
Q703 Ⓔ E-E mode



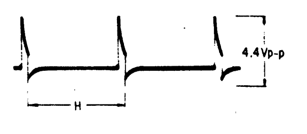
IC003 ㉘ BF PB



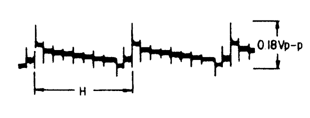
IC001 ㉙ PB



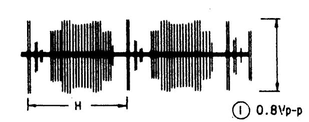
IC004 ① PB



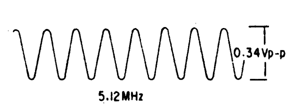
IC003 ㉚ REC/PB



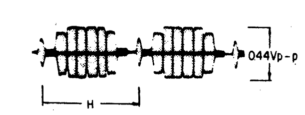
IC001 ㉚ REC



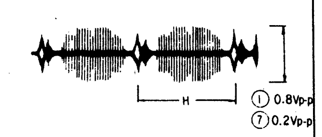
IC003 ①, ㊴ REC



IC003 ㉝ REC / PB



IC001 ㉜ PB



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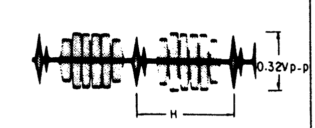

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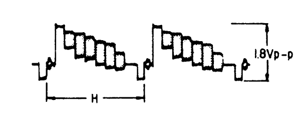

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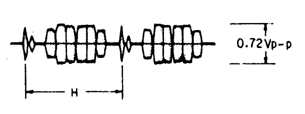

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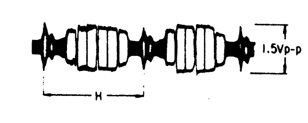

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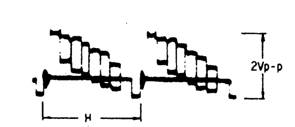

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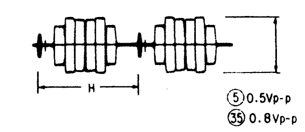

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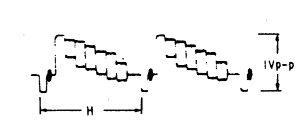
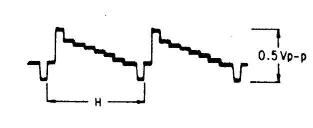
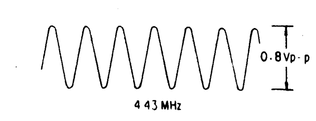


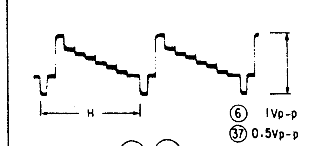
IC001 ③ REC



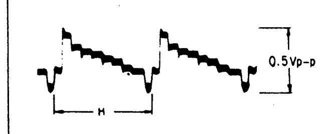
IC001 ㊳ PB



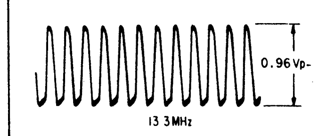
IC003 ⑭ REC / PB



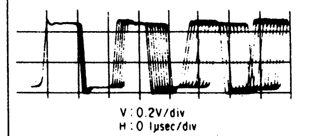
IC001 ⑥, ㊲ REC



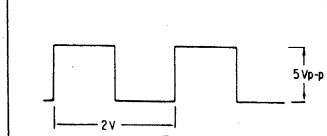
IC401 ㉖ PB



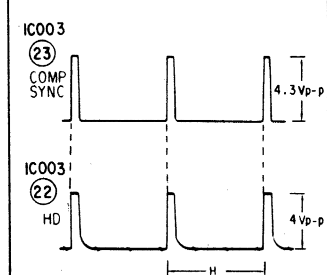
IC003 ⑲ REC/PB



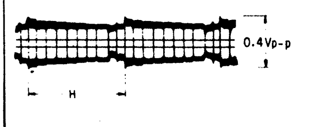
IC001 ⑱ PB



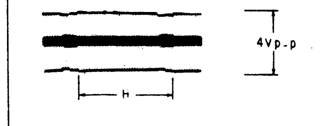
B002 ③ REC / PB



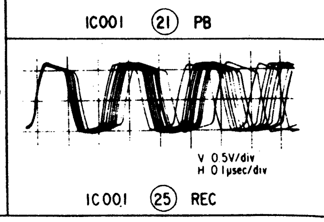
REC / PB



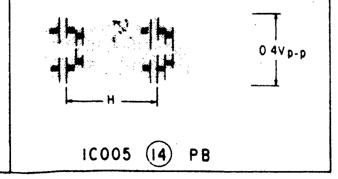
IC001 ㉑ PB



IC005 ④ ㉕ REC

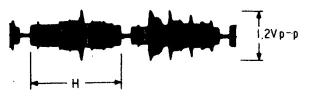


IC001 ㉕ REC



IC005 ⑭ PB

(SECAM)



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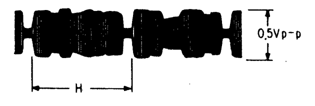

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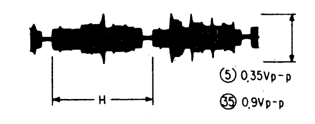
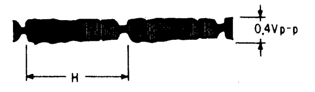


IC003 ⑤, ㉟ SECAM REC



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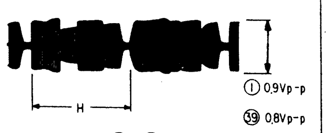
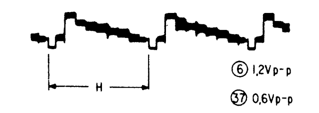
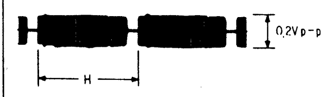


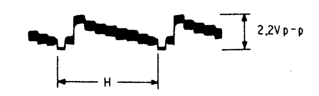
IC003 ①, ㊴ SECAM REC



IC001 ⑥, ㊲ SECAM REC



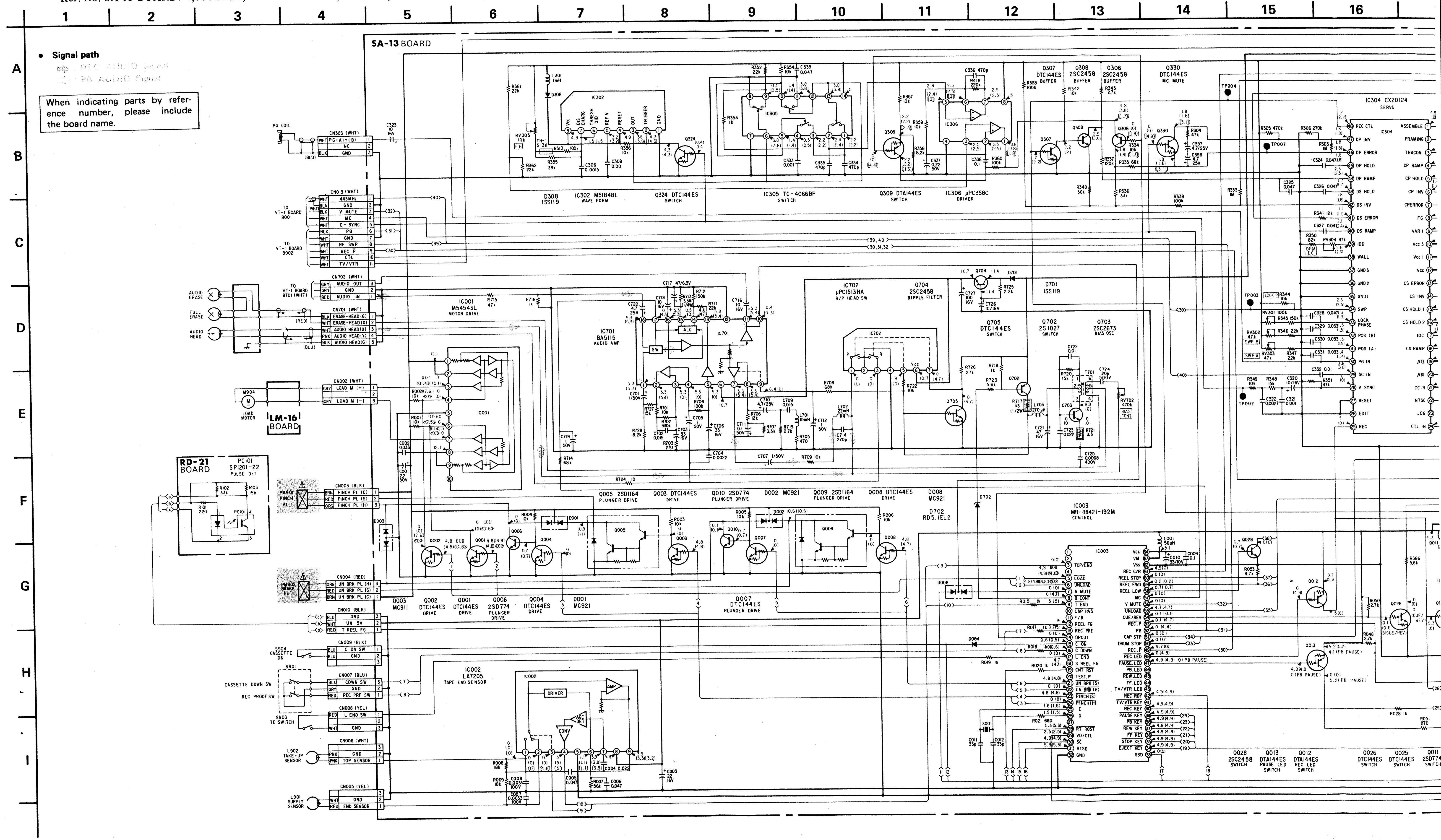
IC001 ㉜ SECAM PB



IC001 ㉟ SECAM PB

4-3. SA-13 (SERVO, SYSTEM CONTROL, AUDIO), FU-40 (FUNCTION, TRACKING CONTROL), LM-16 (LOADING MOTOR), RD-21 (ROTATION DETECTOR), CAPSTAN MOTOR, R STATOR (REEL MOTOR) SCHEMATIC DIAGRAMS

– Ref. No. SA-13 BOARD: 4,000 series, FU-40 BOARD: 8,000 series, LM-16 BOARD: 7,300 series, RD-21 BOARD: 3,000 series, CAPSTAN MOTOR: 8,200 series, R STATOR (REEL MOTOR) BOARD: 8,100 series –



- **Signal path**

When indicating parts by reference number, please include the board name.

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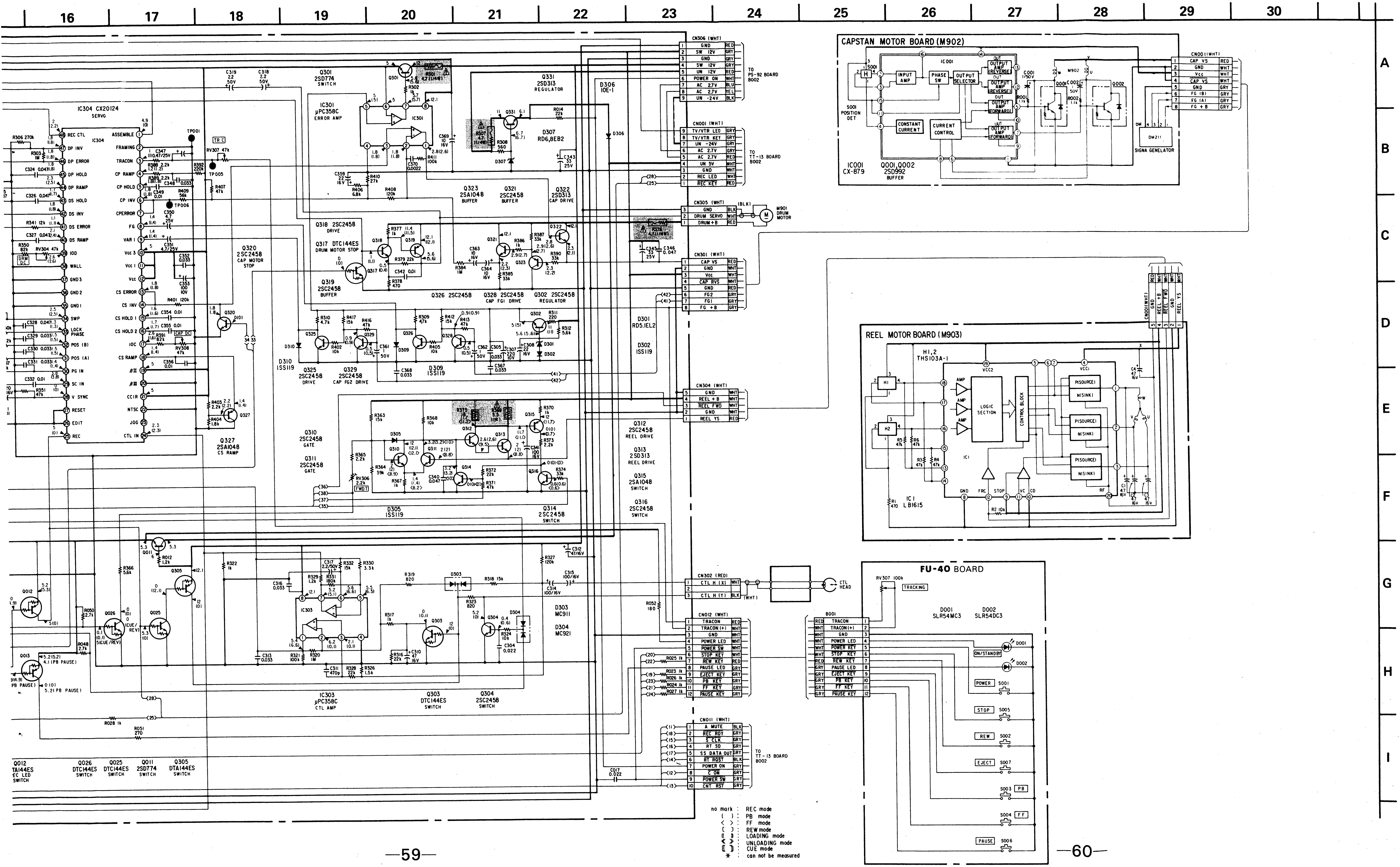
SA-13 BOARD
LM-16 BOARD
RD-21 BOARD
PC101 SP1201-22 PULSE DET
IC302 M51848L WAVE FORM
D308 1SS119
Q324 DTC144ES SWITCH
IC305 TC-4066BP SWITCH
Q309 DTA144ES SWITCH
IC306 μPC358C DRIVER
Q307 DTC144ES BUFFER
Q308 2SC2458 BUFFER
Q306 2SC2458 BUFFER
Q330 DTC144ES MC MUTE
IC304 CX20124 SERVO
IC001 M54543L MOTOR DRIVE
IC701 BA5115 AUDIO AMP
IC702 μPC1513HA R/P HEAD SW
Q704 2SC2458 RIPPLE FILTER
D701 1SS119
Q705 DTC144ES SWITCH
Q702 2SJ027 SWITCH
Q703 2SC2673 BIAS OSC
Q005 2SD1164 PLUNGER DRIVE
Q003 DTC144ES DRIVE
Q010 2SD774 PLUNGER DRIVE
D002 MC921
Q009 2SD1164 PLUNGER DRIVE
Q008 DTC144ES DRIVE
D008 MC921
D702 RD5.1EL2
IC003 MB-88421-192M CONTROL
D003 MC911
Q002 DTC144ES DRIVE
Q001 DTC144ES DRIVE
Q006 2SD774 PLUNGER DRIVE
Q004 DTC144ES DRIVE
D001 MC921
Q007 DTC144ES PLUNGER DRIVE
IC002 LA7205 TAPE END SENSOR
Q028 2SC2458 SWITCH
Q013 DTA144ES PAUSE LED SWITCH
Q012 DTA144ES REC LED SWITCH
Q026 DTC144ES SWITCH
Q025 DTC144ES SWITCH
Q011 2SD774 SWITCH
M904 LOAD MOTOR
PM901 PINCH PL
PM902 BRAKE PL
S904 CASSETTE ON
S901
CASSETTE DOWN SW
REC PROOF SW
S903 TE SWITCH
L902 TAKE-UP SENSOR
L901 SUPPLY SENSOR
PG COIL
AUDIO ERASE
FULL ERASE
AUDIO HEAD
TO VT-1 BOARD B001
TO VT-1 BOARD B002
TO VT-1 BOARD B701 (WHT)
CN303 (WHT)
CN013 (WHT)
CN702 (WHT)
CN701 (WHT)
CN002 (WHT)
CN003 (BLK)
CN004 (RED)
CN010 (BLK)
CN009 (BLK)
CN007 (BLU)
CN008 (YEL)
CN006 (WHT)
CN005 (YEL)
TP002
TP003
TP004
TP007

SERVO, SYSTEM CONTROL, AUDIO

SERVO, SYSTEM CONTROL, AUDIO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IC304 CX20124 SERVO
IC301 μPC358C ERROR AMP
Q301 2SD774 SWITCH
Q331 2SD313 REGULATOR
D306 10E-1
D307 RD6,8EB2
Q323 2SA1048 BUFFER
Q321 2SC2458 BUFFER
Q322 2SD313 CAP DRIVE
Q318 2SC2458 DRIVE
Q317 DTC144ES DRUM MOTOR STOP
Q319 2SC2458 BUFFER
Q320 2SC2458 CAP MOTOR STOP
Q326 2SC2458
Q328 2SC2458 CAP FG1 DRIVE
Q302 2SC2458 REGULATOR
D301 RD5.1EL2
D302 1SS119
D310 1SS119
Q325 2SC2458 DRIVE
Q329 2SC2458 CAP FG2 DRIVE
D309 1SS119
Q327 2SA1048 CS RAMP
Q310 2SC2458 GATE
Q311 2SC2458 GATE
D305 1SS119
Q314 2SC2458 SWITCH
Q312 2SC2458 REEL DRIVE
Q313 2SD313 REEL DRIVE
Q315 2SA1048 SWITCH
Q316 2SC2458 SWITCH
IC303 μPC358C CTL AMP
Q303 DTC144ES SWITCH
Q304 2SC2458 SWITCH
D303 MC911
D304 MC921
Q012 TA144ES EC LED SWITCH
Q026 DTC144ES SWITCH
Q025 DTC144ES SWITCH
Q011 2SD774 SWITCH
Q305 DTA144ES SWITCH
CN306 (WHT)
GND
SW 12V
GND
SW 12V
UN 12V
POWER ON
AC 2.7V
AC 2.7V
UN -24V
TO PS-92 BOARD B002
CN001 (WHT)
TV/VTR LED
TV/VTR KEY
UN -24V
AC 2.7V
AC 2.7V
UN 5V
GND
REC LED
REC KEY
TO TT-13 BOARD B002
CN305 (WHT)
GND
DRUM SERVO
DRUM +B
M901 DRUM MOTOR
CN301 (WHT)
CAP VS
GND
Vcc
CAP RVS
GND
FG2
FG1
FG +B
CN304 (WHT)
GND
REEL +B
REEL FWD
GND
REEL VS
CN302 (RED)
CTL H (X)
CTL H (Y)
CTL HEAD
CN012 (WHT)
TRACON
TRACON (+)
GND
POWER LED
POWER SW
STOP KEY
REW KEY
PAUSE LED
EJECT KEY
PB KEY
FF KEY
PAUSE KEY
CN011 (WHT)
A MUTE
REC RDY
S CLK
RT SD
SS DATA OUT
RT RQST
POWER ON
C ON
POWER SW
CNT RST
TO TT-13 BOARD B002
CAPSTAN MOTOR BOARD (M902)
S001 POSITION DET
IC001 CX-879
Q001,Q002 2SD992 BUFFER
INPUT AMP
PHASE SW
OUTPUT SELECTOR
OUTPUT AMP (REVERSE)
OUTPUT AMP (FORWARD)
CONSTANT CURRENT
CURRENT CONTROL
M902
DM211 SIGNAL GENELATOR
CN001 (WHT)
CAP VS
GND
Vcc
CAP VS
GND
FG (B)
FG (A)
FG +B
REEL MOTOR BOARD (M903)
H1,2 THS103A-1
LOGIC SECTION
CONTROL BLOCK
P(SOURCE)
N(SINK)
IC1 LB1615
FU-40 BOARD
RV307 100k
TRACKING
D001 SLR54MC3
D002 SLR54DC3
ON/STANDBY
POWER S001
STOP S005
REW S002
EJECT S007
S003 PB
S004 FF
PAUSE S006

no mark : REC mode
( ) : PB mode
< > : FF mode
〔 〕 : REW mode
(( )) : LOADING mode
《 》 : UNLOADING mode
〚 〛 : CUE mode
* : can not be measured

SA-13 (SERVO, SYSTEM CONTROL, AUDIO), FU-40 (FUNCTION, TRACKING CONTROL), LM-16 (LOADING MOTOR), RD-21 (ROTATION DETECTOR), CAPSTAN MOTOR, R STATOR (REEL MO

– Ref. No. SA-13 BOARD: 4,000 series, FU-40 BOARD: 8,000 series, LM-16 BOARD: 7,300 series, RD-21 BOARD: 3,000 series, CAPSTAN MOTOR: 8,200 series, R STATOR (REEL MOTOR) BOARD: 8,100 series

Note:

SCHEMATIC DIAGRMS

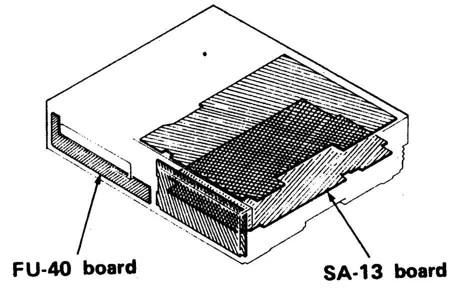
- All capacitors are in μF unless otherwise noted, pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/6W unless otherwise noted.
  kΩ : 1000Ω, MΩ : 1000kΩ.
- All variable and semi-fixed resistors have characteristics curve B, unless otherwise noted.
- : nonfiammable resistor.
- : fusible resistor.
- ☐ : panel disignation.
- ☐ : adjustment for repair.
- ▬ : B + bus.
- - - - : B – bus.
- The voltage value is a reference value between the grounding when the color bar signal is received from a color bar generator.
- All voltage are dc measured with a VOM (10MΩ)

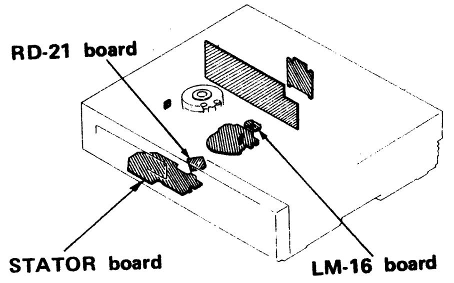
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

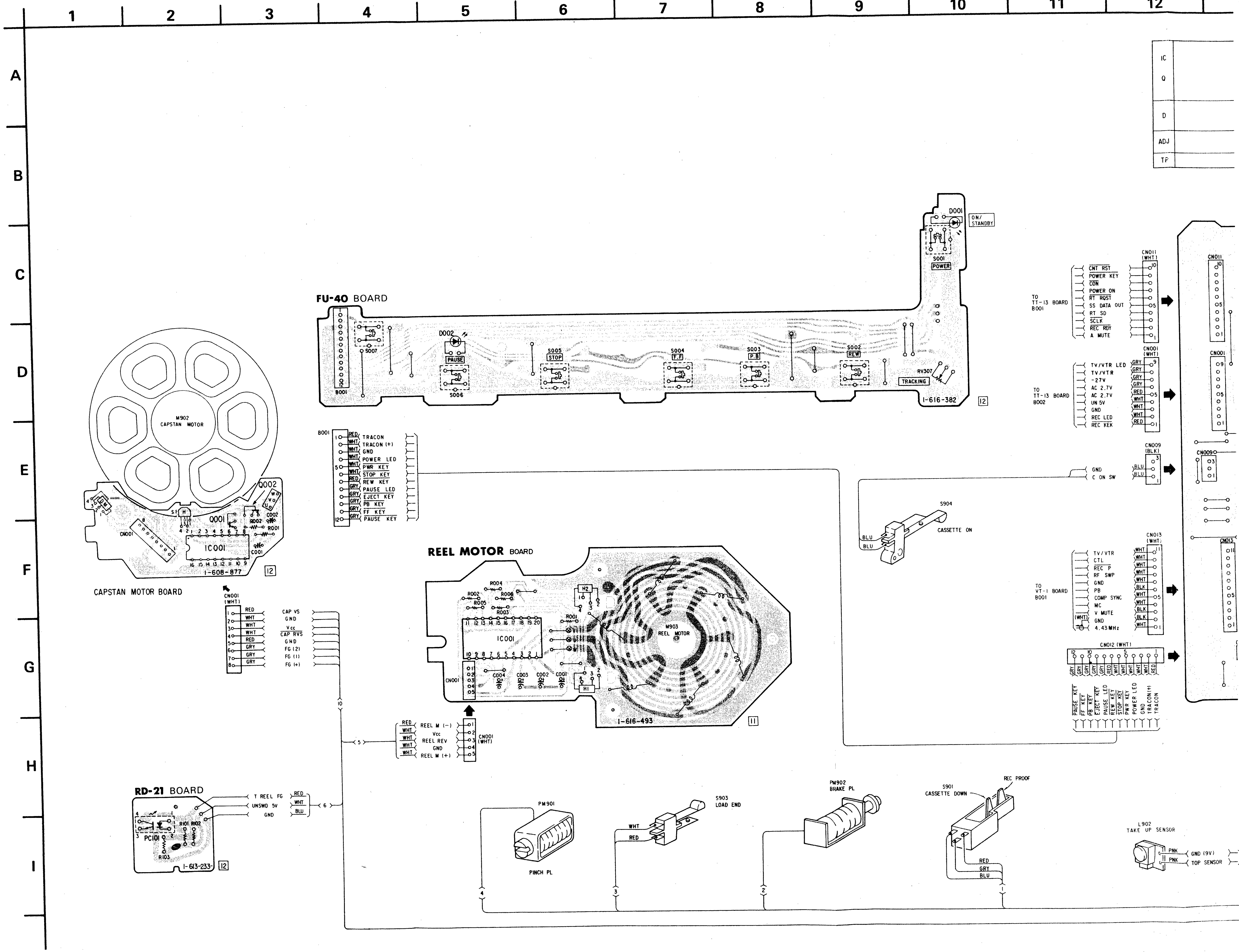
```
When indicating parts by refer-
ence number, please include
the board name.
```

PRINTED WIRING BOARDS

- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ▨ : conductor side pattern.
- ▨ : component-side pattern.
- ▨ : B+ pattern.
- Digital transistor (SA-13 : Q001, 002, 003, 004, 007, 008, 012, 013, 025, 026, 303, 305, 307, 309, 324, 330, 705) transistor with resistors.
  Refer to the SA-13 board schematic diagram for digital transistor.


FU-40 board
SA-13 board


RD-21 board
R STATOR board
LM-16 board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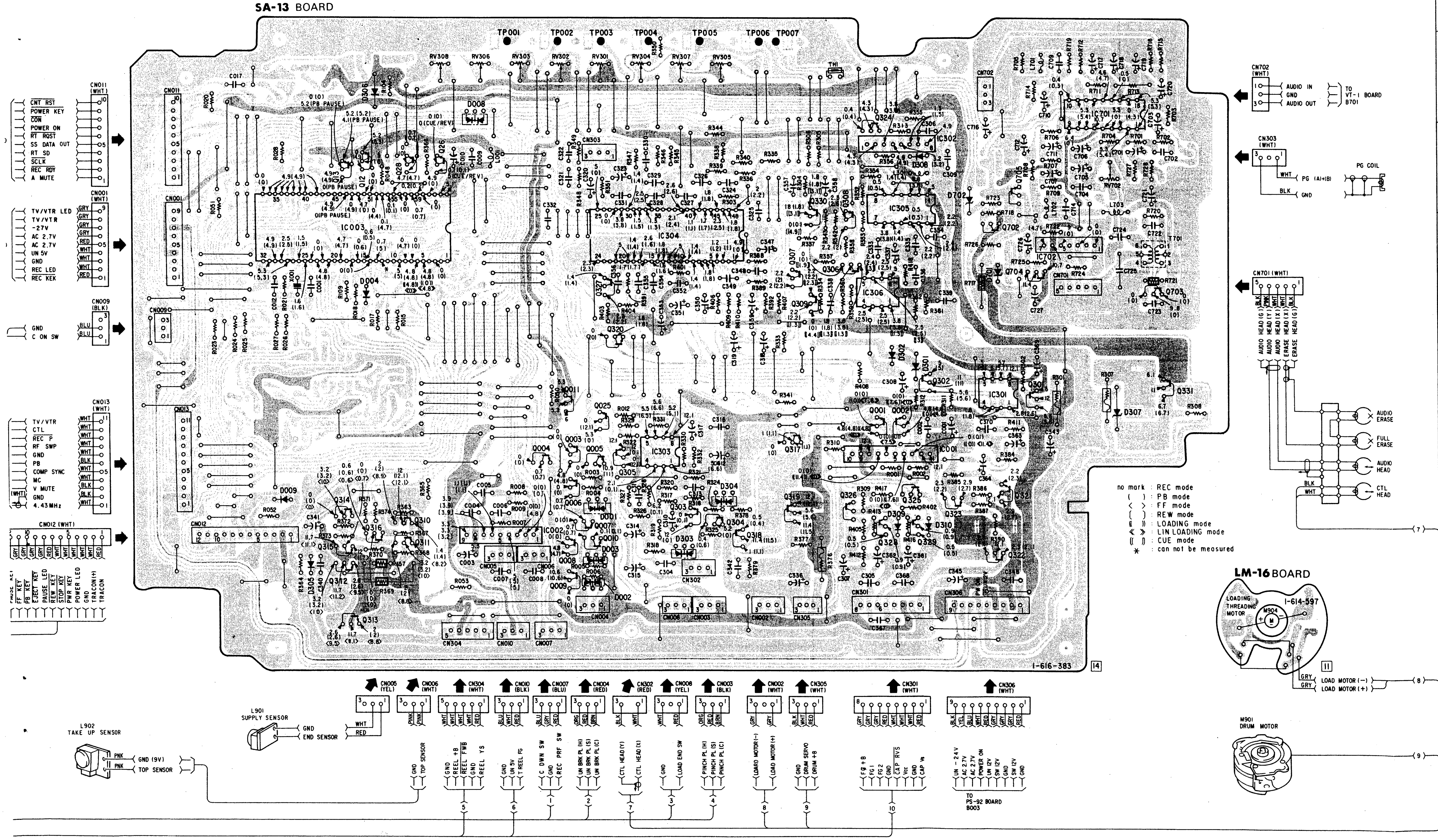
D
ADJ
TP
FU-40 BOARD
D001
ON/STANDBY
S001 POWER
D002
PAUSE
S005 STOP
S004 F.F
S003 P.B
S002 REW
S006
S007
RV307 TRACKING
B001
1-616-382
12
B001
TRACON
TRACON (+)
GND
POWER LED
PWR KEY
STOP KEY
REW KEY
PAUSE LED
EJECT KEY
PB KEY
FF KEY
PAUSE KEY
M902 CAPSTAN MOTOR
Q002
Q001
IC001
CN001
1-608-877
CAPSTAN MOTOR BOARD
CN001 (WHT)
CAP VS
GND
Vcc
CAP RVS
GND
FG (2)
FG (1)
FG (+)
REEL MOTOR BOARD
R004
R002
R006
R005
R003
R001
IC001
H2
H1
M903 REEL MOTOR
C004
C003
C002
C001
CN001
1-616-493
11
REEL M (–)
Vcc
REEL REV
GND
REEL M (+)
CN001 (WHT)
RD-21 BOARD
PC101
R101
R102
R103
1-613-233
12
T REEL FG
UNSWD 5V
GND
PM901
PINCH PL
S903 LOAD END
PM902 BRAKE PL
S901 CASSETTE DOWN
REC PROOF
S904 CASSETTE ON
L902 TAKE UP SENSOR
GND (9V)
TOP SENSOR
TO TT-13 BOARD B001
CN011 (WHT)
CNT RST
POWER KEY
CON
POWER ON
RT RQST
SS DATA OUT
RT SO
SCLK
REC RDY
A MUTE
TO TT-13 BOARD B002
CN001 (WHT)
TV/VTR LED
TV/VTR
-27V
AC 2.7V
AC 2.7V
UN 5V
GND
REC LED
REC KEK
CN009 (BLK)
GND
C ON SW
TO VT-1 BOARD B001
CN013 (WHT)
TV/VTR
CTL
REC P
RF SWP
GND
PB
COMP SYNC
MC
V MUTE
GND
4.43MHz
CN012 (WHT)
PAUSE KEY
FF KEY
PB KEY
EJECT KEY
PAUSE LED
REW KEY
STOP KEY
PWR KEY
POWER LED
GND
TRACON(+)
TRACON
CN011
CN001
CN009
CN013

TOR, R STATOR (REEL MOTOR) PRINTED WIRING BOARDS

MOTOR) BOARD: 8,100 series –

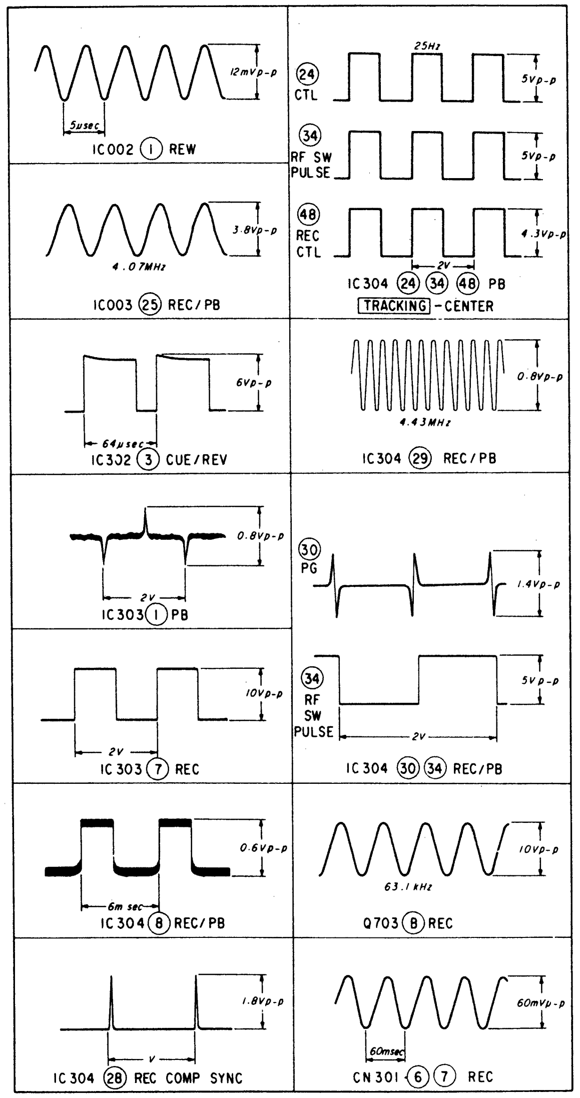
	12	13	14	15	16	17	18	19	20	21	22
IC			IC003		IC002	IC304 IC303		IC302 IC305 IC306 IC001	IC301	IC702 IC701	
Q			013 012 314 312 315 313	028 026 316 310 311	004 011 003 006 008 009	327 320 025 305 005 303 007 010	307 309 317 318 304 319	324 330 308 306 302 001 002 326 328 325 329	702 705 704 323 321 322	301 703	331
D		009	306 004 305	008	003 002	001 303	304	308 302 301 309	310 702 701	307	
ADJ				308 306	303 302 301	304 307	305			702	
TP					001 002 003	004 005	006 007				

SA-13 BOARD


CN011 (WHT)
CNT RST
POWER KEY
CON
POWER ON
RT RQST
SS DATA OUT
RT SD
SCLK
REC RDY
A MUTE
CN001 (WHT)
TV/VTR LED
TV/VTR
-27V
AC 2.7V
AC 2.7V
UN 5V
GND
REC LED
REC KEK
CN009 (BLK)
GND
C ON SW
CN013 (WHT)
TV/VTR
CTL
REC P
RF SWP
GND
PB
COMP SYNC
MC
V MUTE
GND
4.43MHz
CN012 (WHT)
FF KEY
PB KEY
EJECT KEY
PAUSE LED
REW KEY
STOP KEY
PWR KEY
POWER LED
GND
TRACON(+)
TRACON
TP001
TP002
TP003
TP004
TP005
TP006
TP007
IC003
IC304
IC303
IC302
IC305
IC306
IC301
IC001
IC002
IC701
IC702
1-616-383
14
CN702 (WHT)
AUDIO IN
GND
AUDIO OUT
TO VT-1 BOARD B701
CN303 (WHT)
PG (A)+(B)
GND
PG COIL
CN701 (WHT)
AUDIO HEAD (G)
AUDIO HEAD (Y)
AUDIO HEAD (X)
ERASE HEAD (X)
ERASE HEAD (G)
AUDIO ERASE
FULL ERASE
AUDIO HEAD
CTL HEAD
LM-16 BOARD
LOADING THREADING MOTOR
M904
1-614-597
11
LOAD MOTOR (−)
LOAD MOTOR (+)
M901 DRUM MOTOR
L902 TAKE UP SENSOR
GND (9V)
TOP SENSOR
L901 SUPPLY SENSOR
GND
END SENSOR
CN005 (YEL)
CN006 (WHT)
CN304 (WHT)
CN010 (BLK)
CN007 (BLU)
CN004 (RED)
CN302 (RED)
CN008 (YEL)
CN003 (BLK)
CN002 (WHT)
CN305 (WHT)
CN301 (WHT)
CN306 (WHT)
GND
TOP SENSOR
GND
REEL +B
REEL FWB
GND
REEL YS
GND
UN 5V
T REEL FG
C DWN SW
GND
REC PRF SW
UN BRK PL (H)
UN BRK PL (S)
UN BRK PL (C)
CTL HEAD (Y)
CTL HEAD (X)
GND
LOAD END SW
PINCH PL (H)
PINCH PL (S)
PINCH PL (C)
LOARD MOTOR (−)
LOAD MOTOR (+)
GND
DRUM SERVO
DRUM +B
FG +B
FG 1
FG 2
GND
CAP RVS
Vcc
GND
CAP Vs
UN −24V
AC 2.7V
AC 2.7V
POWER ON
UN 12V
SW 12V
GND
SW 12V
GND
TO PS-92 BOARD B003

no mark : REC mode
( ) : PB mode
〈 〉 : FF mode
[ ] : REW mode
(( )) : LOADING mode
《 》 : LIN LOADING mode
[[ ]] : CUE mode
* : can not be measured

SA-13 BOARD



4-4. TT-13 (TIMER, TUNING CONTROL, DISPLAY), PS-92 (POWER SUPPLY), PS-93 (SWITCHING REGULATOR), VS-5 (VOLTAGE SELECTOR) SCHEMATIC DIAGRAMS

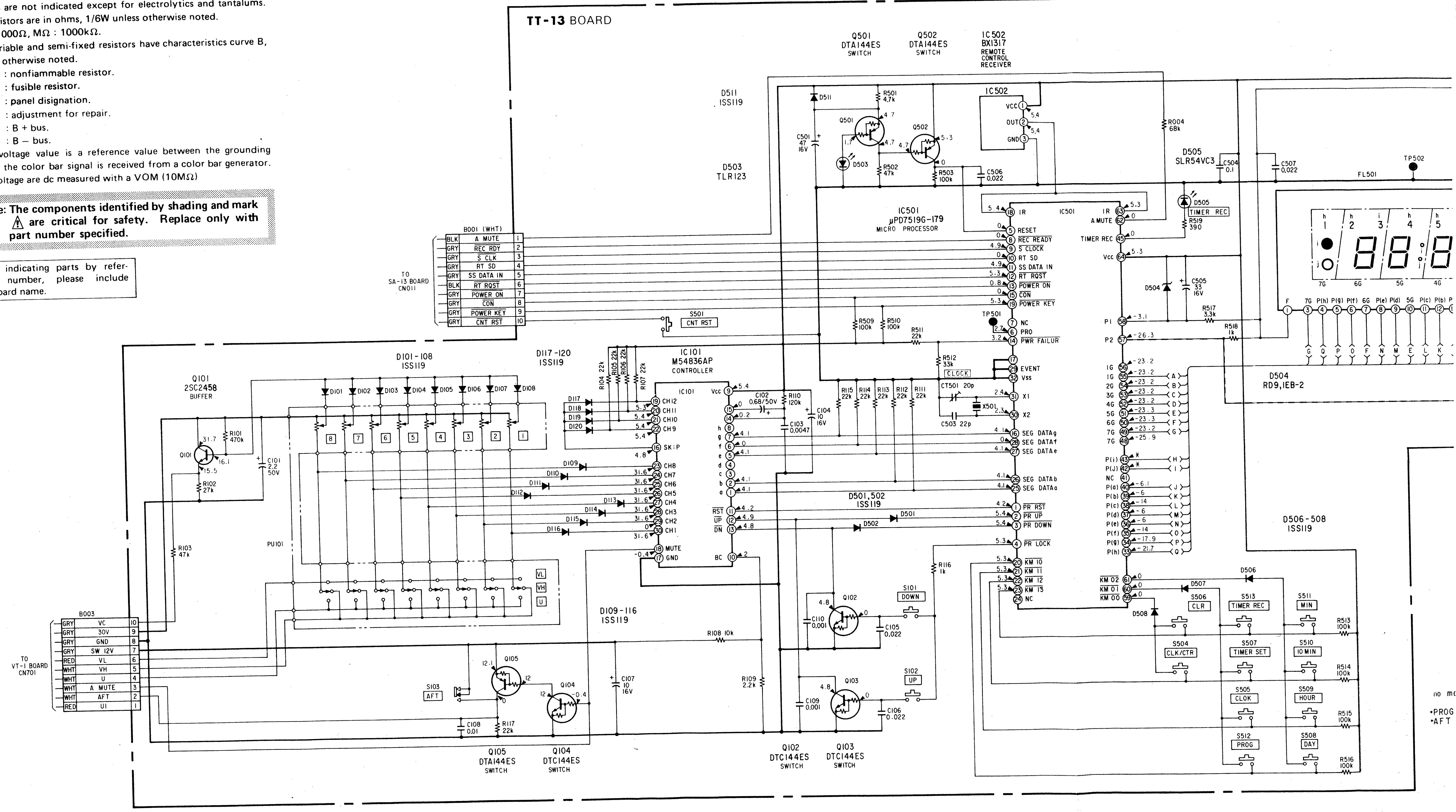
– Ref. No. TT-13 BOARD: 6,000 series, PS-92 BOARD: 7,200 series, PS-93 BOARD: 7,100 series, VS-5 BOARD: 7,500 series –

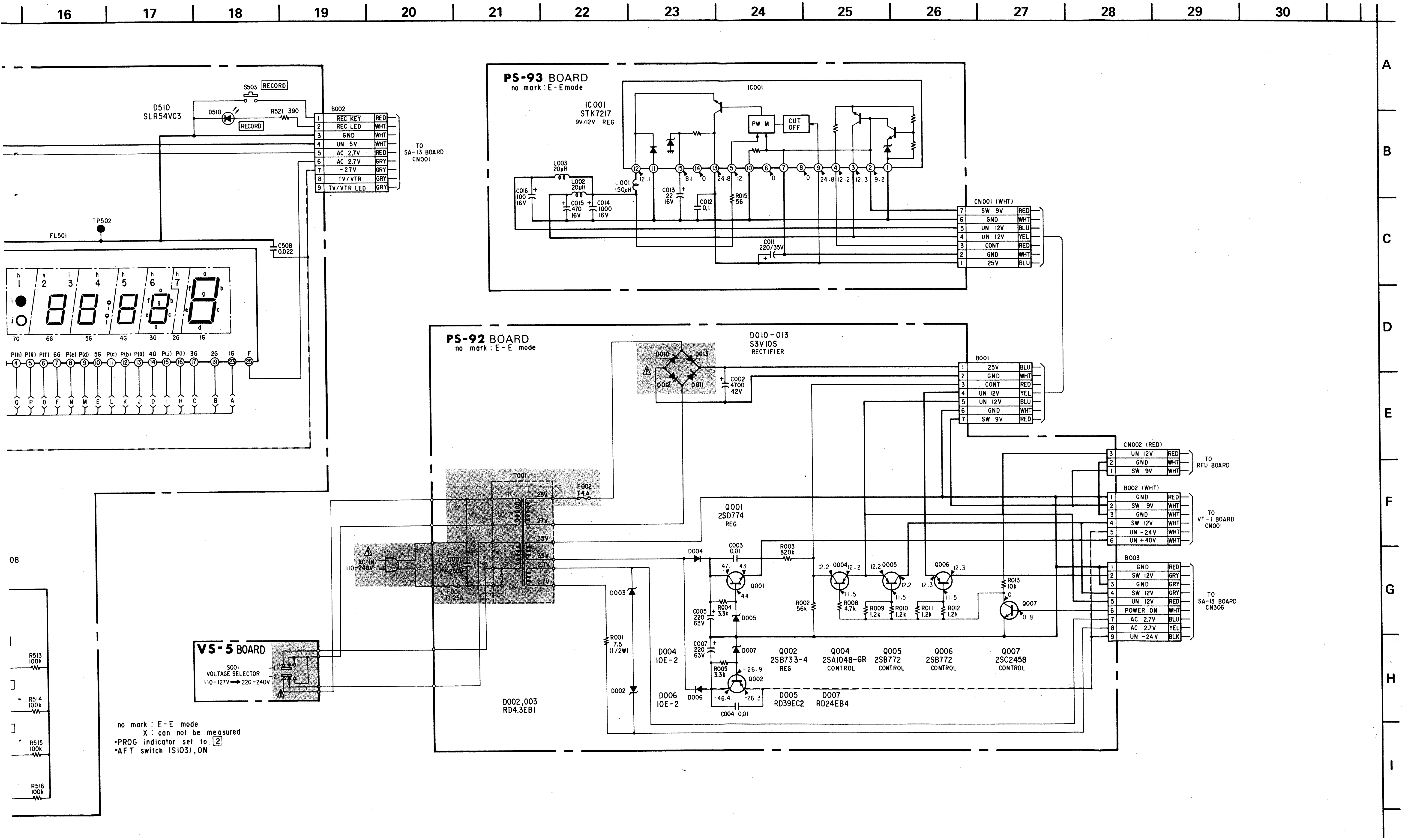
Note:

- All capacitors are in μF unless otherwise noted, pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/6W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ.
- All variable and semi-fixed resistors have characteristics curve B, unless otherwise noted.
- : nonfiammable resistor.
- : fusible resistor.
- ☐ : panel disignation.
- ☐ : adjustment for repair.
- ━━ : B + bus.
- - - - : B – bus.
- The voltage value is a reference value between the grounding when the color bar signal is received from a color bar generator.
- All voltage are dc measured with a VOM (10MΩ)

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.


TT-13 BOARD
Q501 DTA144ES SWITCH
Q502 DTA144ES SWITCH
IC502 BX1317 REMOTE CONTROL RECEIVER
D511 ISS119
D503 TLR123
D505 SLR54VC3
IC501 μPD7519G-179 MICRO PROCESSOR
TP501
TP502
FL501
B001 (WHT)
A MUTE
REC RDY
S CLK
RT SD
SS DATA IN
RT RQST
POWER ON
CON
POWER KEY
CNT RST
TO SA-13 BOARD CN011
S501 CNT RST
D101-108 ISS119
D117-120 ISS119
Q101 2SC2458 BUFFER
IC101 M54836AP CONTROLLER
D109-116 ISS119
PU101
B003
VC
30V
GND
SW 12V
VL
VH
U
A MUTE
AFT
UI
TO VT-1 BOARD CN701
S103 AFT
Q105 DTA144ES SWITCH
Q104 DTC144ES SWITCH
Q102 DTC144ES SWITCH
Q103 DTC144ES SWITCH
S101 DOWN
S102 UP
D501,502 ISS119
D504 RD9,1EB-2
D506-508 ISS119
S506 CLR
S513 TIMER REC
S511 MIN
S504 CLK/CTR
S507 TIMER SET
S510 10 MIN
S505 CLOK
S509 HOUR
S512 PROG
S508 DAY
TIMER REC

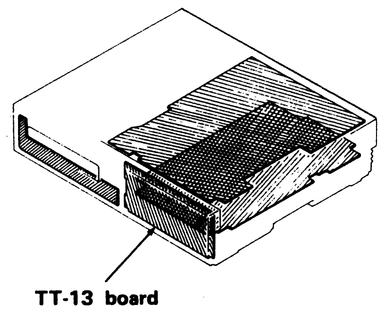

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
A
B
C
D
E
F
G
H
I
S503 RECORD
D510 SLR54VC3
D510
RECORD
R521 390
B002
REC KEY
REC LED
GND
UN 5V
AC 2.7V
AC 2.7V
-27V
TV/VTR
TV/VTR LED
TO SA-13 BOARD CN001
TP502
FL501
C508 0.022
PS-93 BOARD
no mark : E-E mode
IC001
IC001 STK7217 9V/12V REG
PWM
CUT OFF
L003 20µH
L002 20µH
L001 150µH
C016 100 16V
C015 470 16V
C014 1000 16V
C013 22 16V
C012 0.1
R015 56
C011 220/35V
CN001 (WHT)
SW 9V
GND
UN 12V
UN 12V
CONT
GND
25V
PS-92 BOARD
no mark : E-E mode
D010-013 S3V10S RECTIFIER
D010
D011
D012
D013
C002 4700 42V
B001
25V
GND
CONT
UN 12V
UN 12V
GND
SW 9V
CN002 (RED)
UN 12V
GND
SW 9V
TO RFU BOARD
B002 (WHT)
GND
SW 9V
GND
SW 12V
UN -24V
UN +40V
TO VT-1 BOARD CN001
B003
GND
SW 12V
GND
SW 12V
UN 12V
POWER ON
AC 2.7V
AC 2.7V
UN -24V
TO SA-13 BOARD CN306
T001
25V
27V
35V
35V
2.7V
2.7V
F002 T4A
F001 T1.25A
C001 0.01 250V
AC IN 110-240V
Q001 2SD774 REG
D004
C003 0.01
R003 820k
R002 56k
Q004
Q005
Q006
R008 4.7k
R009 1.2k
R010 1.2k
R011 1.2k
R012 1.2k
R013 10k
Q007
D003
D002
R001 7.5 (1/2W)
C005 220 63V
R004 3.3k
D005
C007 220 63V
D007
R005 3.3k
Q002
C004 0.01
D006
D004 10E-2
D006 10E-2
Q002 2SB733-4 REG
Q004 2SA1048-GR CONTROL
Q005 2SB772 CONTROL
Q006 2SB772 CONTROL
Q007 2SC2458 CONTROL
D005 RD39EC2
D007 RD24EB4
D002,003 RD4.3EB1
VS-5 BOARD
S001 VOLTAGE SELECTOR 110-127V → 220-240V
R513 100k
R514 100k
R515 100k
R516 100k
08

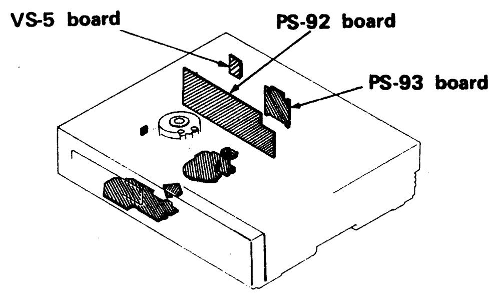
no mark : E-E mode
X : can not be measured
•PROG indicator set to 2
•AFT switch (S103), ON

TT-13 (TIMER, TUNING CONTROL, DISPLAY), PS-92 (POWER SUPPLY), PS-93 (SWITCHING REGULATOR), VS-5 (VOLTAGE SELECTOR) PRINTED WIRING BOARDS

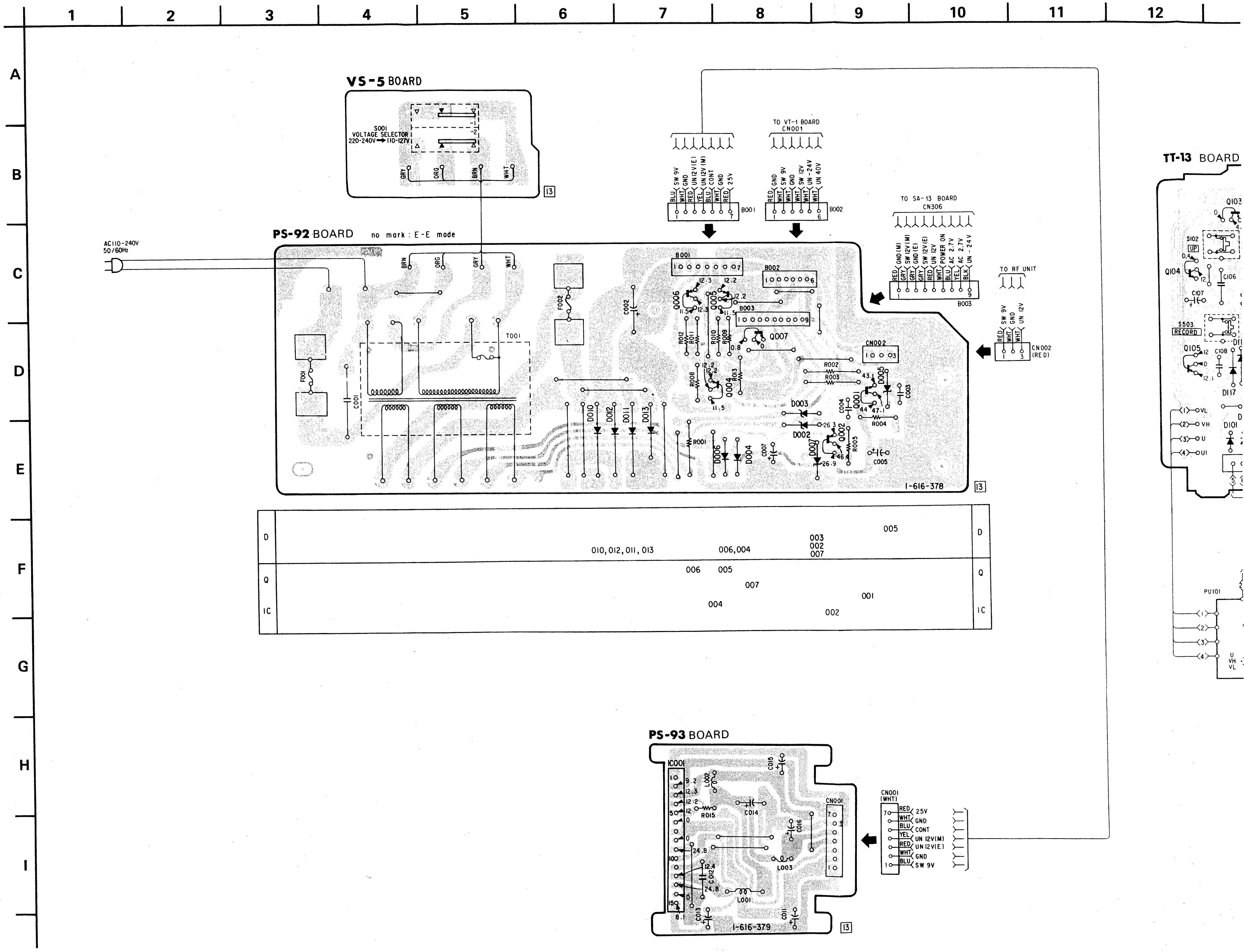
– Ref. No. TT-13 BOARD: 6,000 series, PS-92 BOARD: 7,200 series, PS-93 BOARD: 7,100 series, VS-5 BOARD: 7,500 series –

- o— : Indicates a leadwire mounted on the component side.
- •— : Indicates a leadwire mounted on the printed side.
- ▒ : soldering side.
- ░ : B+ pattern.
- Digital transistor (TT-13 : Q102, 103, 104, 105, 501, 502) transistor with resistors.
  Refer to the TT-13 board schematic diagram for digital transistor.

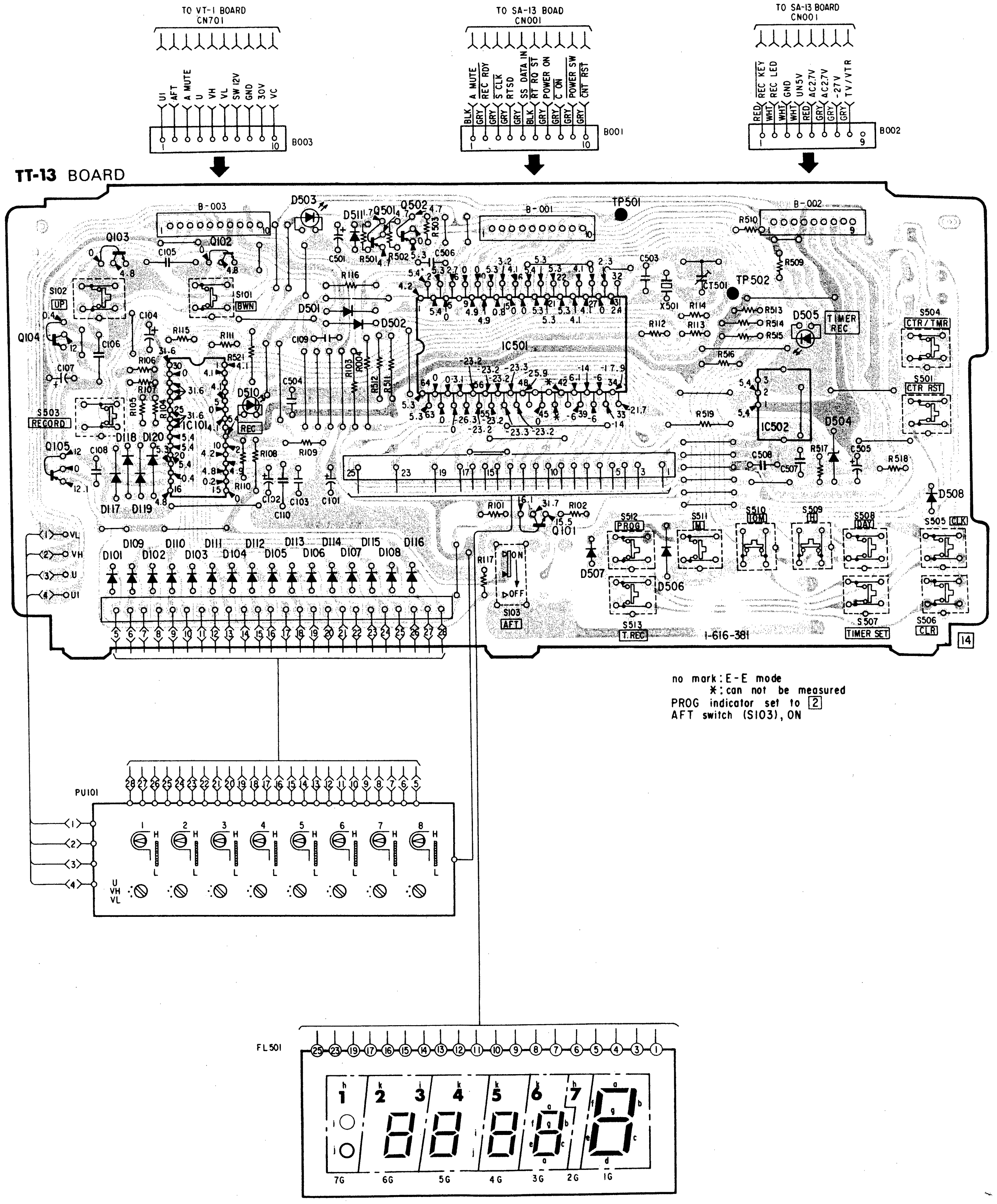



VS-5 board
PS-92 board
PS-93 board

When indicating parts by reference number, please include the board name.


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
I
VS-5 BOARD
S001
VOLTAGE SELECTOR
220-240V → 110-127V
GRY
ORG
BRN
WHT
13
AC110-240V
50/60Hz
PS-92 BOARD
no mark : E-E mode
T001
F001
F002
C001
C002
B001
B002
B003
CN002
Q001
Q002
Q004
Q005
Q006
Q007
D002
D003
D004
D005
D006
D007
D010
D011
D012
D013
R001
R002
R003
R004
R005
R008
R009
R010
R011
R012
R013
C003
C004
C005
C007
1-616-378
TO VT-1 BOARD
CN001
BLU SW 9V
WHT GND
RED UN 12V(E)
YEL UN 12V(M)
BLU CONT
WHT GND
RED 25V
RED GND
WHT SW 9V
WHT GND
WHT SW 12V
WHT UN -24V
WHT UN 40V
TO SA-13 BOARD
CN306
RED GND(M)
GRY SW 12V(M)
GRY GND(E)
GRY SW 12V(E)
RED UN 12V
WHT POWER ON
BLU AC 2.7V
YEL AC 2.7V
BLK UN -24V
TO RF UNIT
RED SW 9V
WHT GND
WHT UN 12V
CN002
(RED)
TT-13 BOARD
Q103
S102
UP
Q104
C106
C107
S503
RECORD
Q105
C108
D117
D101
PU101
VL
VH
U
UI
PS-93 BOARD
IC001
L001
L002
L003
R015
C011
C012
C013
C014
C015
C016
CN001
1-616-379
CN001
(WHT)
RED 25V
WHT GND
BLU CONT
YEL UN 12V(M)
RED UN 12V(E)
WHT GND
BLU SW 9V

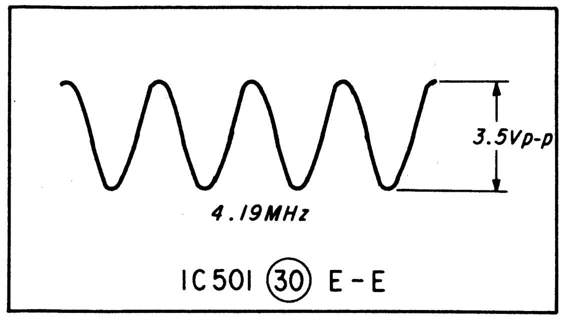
D	010, 012, 011, 013		006, 004		003 002 007	005	D
Q		006	005	007		001	Q
IC			004		002		IC


TO VT-1 BOARD CN701
UI AFT A MUTE U VH VL SW 12V GND 30V VC
B003
TO SA-13 BOAD CN001
BLK A MUTE, GRY REC RDY, GRY S CLK, GRY RTSD, GRY SS DATA IN, BLK RT RQ ST, GRY POWER ON, GRY C ON, GRY POWER SW, GRY CNT RST
B001
TO SA-13 BOARD CN001
RED REC KEY, WHT REC LED, WHT GND, WHT UN5V, RED AC27V, GRY AC27V, GRY -27V, GRY TV/VTR
B002
TT-13 BOARD
B-003
B-001
B-002
TP501
TP502
D503
D511
Q501
Q502
Q103
Q102
Q104
Q105
S102 UP
S101 BWN
S503 RECORD
IC101
IC501
IC502
X501
CT501
D501
D502
D504
D505 TIMER REC
D510 REC
D118 D120
D117 D119
S504 CTR/TMR
S501 CTR RST
S505 CLK
S506 CLR
S507 TIMER SET
S508 DAY
S509 H
S510 10M
S511 M
S512 PROG
S513 T.REC
S103 AFT ON OFF
D506
D507
D508
Q101
D101 D102 D103 D104 D105 D106 D107 D108 D109 D110 D111 D112 D113 D114 D115 D116
VL VH U UI
1-616-381
14
PU101
U VH VL
FL501
7G 6G 5G 4G 3G 2G 1G

no mark: E-E mode
*: can not be measured
PROG indicator set to 2
AFT switch (S103), ON

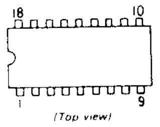
TP	D	Q IC
TP501	503 511	502 501 103,102
TP502	501 502 505	104 IC501
	510	IC101 IC502
	118,120 117,119 504	105
	508	101
	507,506	
	D101〜116	
TP	D	Q IC

TT-13 BOARD

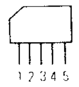

3.5Vp-p
4.19MHz
IC501 (30) E-E

4-5. SEMICONDUCTORS

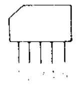
BA5115


18
10
1
9
(Top view)

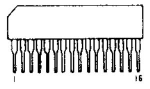
BA634



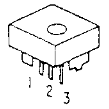
BA7004
TA7060AP



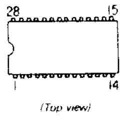
BA7007



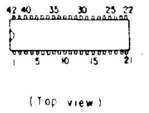
BX1317



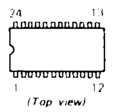
CX-866A
CX-866B
CX20045


28
15
1
14
(Top view)

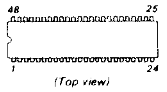
CX10021B-NP
CX10021B-P


42 40 35 30 25 22
1 5 10 15 21
(Top view)

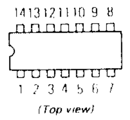
CX10023


24
13
1
12
(Top view)

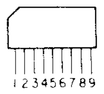
CX20043
CX20124


48
25
1
24
(Top view)

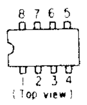
HD14066BP
MSM4066BRS
TC4066BP
μPD4066BC


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

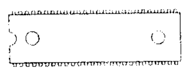
LA7205
CX894



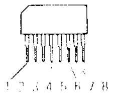
LM358P
μPC358C


8 7 6 5
1 2 3 4
(Top view)

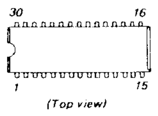
MB88421-192M



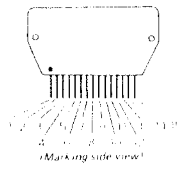
M51848L
μPC1391H
μPC1391HA
CX20061



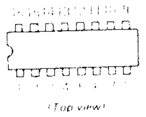
M54836AP


30
16
1
15
(Top view)

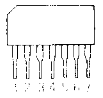
STK7217


(Marking side view)

TA7607AP



μPC1513HA



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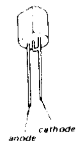
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cathode

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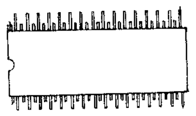

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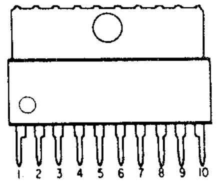
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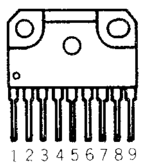

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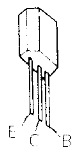

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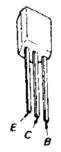
DTA144ES
DTC124ES
DTC144ES
DTC144WS



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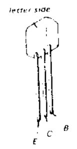
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E
C
B

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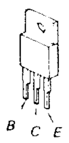

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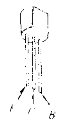

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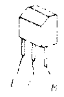

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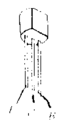

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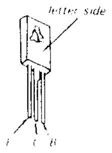
letter side
E
C
B

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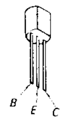

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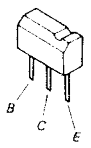

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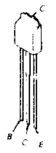

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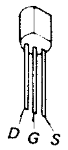

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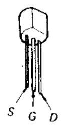

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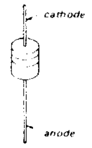
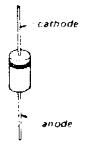

cathode
anode

10E-1
10E-2
ERB12-02
GP08D
HZT33-02


cathode
anode

EQA02-05D1
EQA02-23C
HZ23EB4
HZ4.3EB1
HZ4.3EB2
HZ4.3EB3
HZ5.6EB3
HZ9.1EB2
RD24EB4
RD39EC2
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RD5.1EL2
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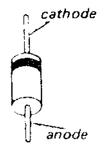
RD5.6EN3
RD6.8EB2
RD6.8EL1
RD9.1EB2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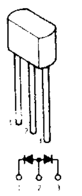

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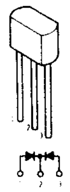

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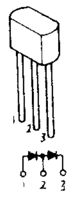

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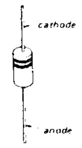
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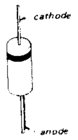
anode

S3V10S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anode

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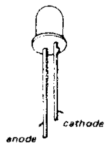
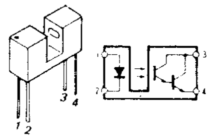
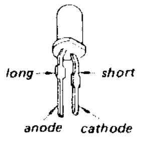
SLR-54VC3
SLR54DC3


anode
cathode

SPI201-22



TLR123
TLR124


long
short
anode
cathode

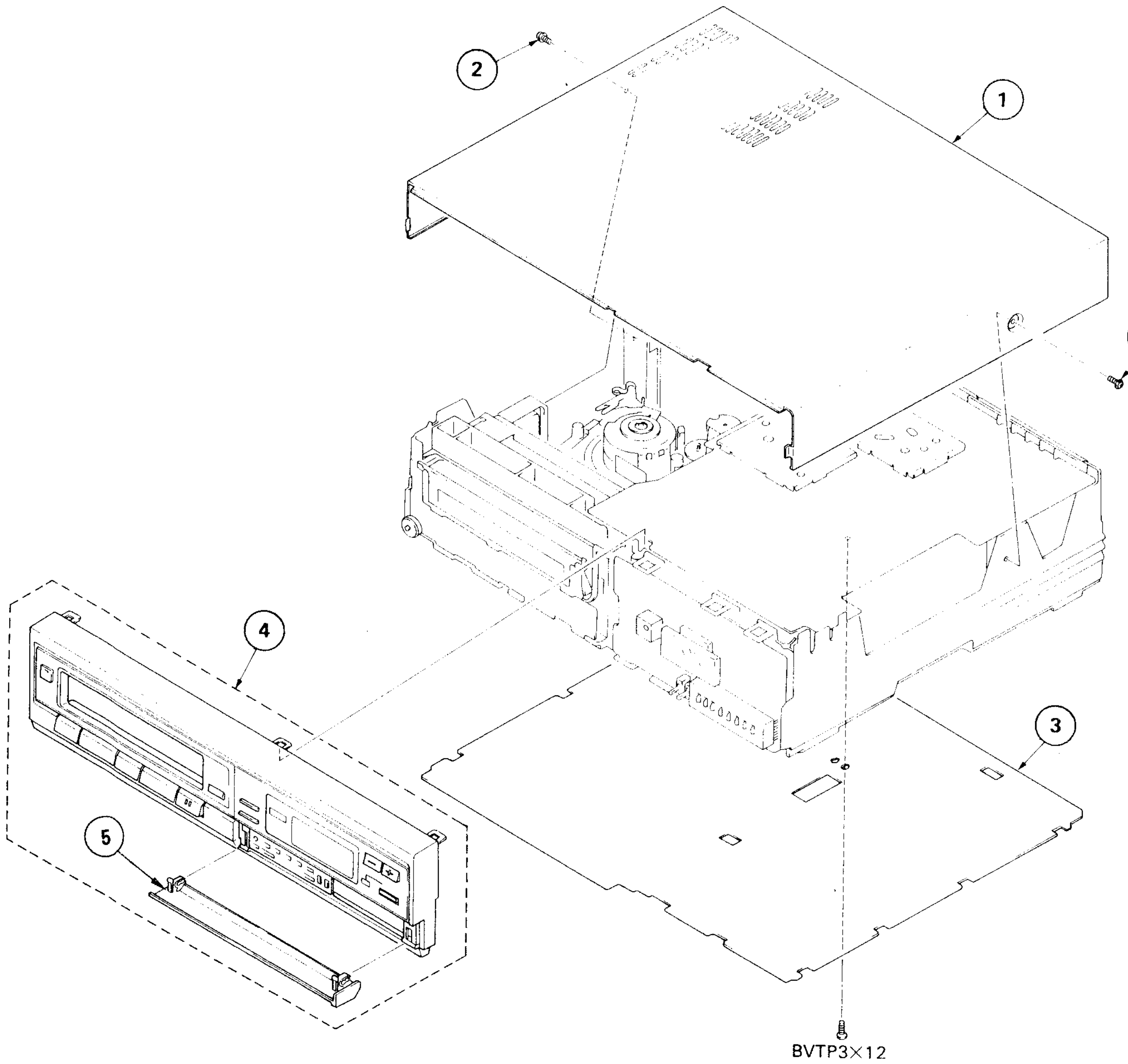
SECTION 5
EXPLODED VIEWS

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

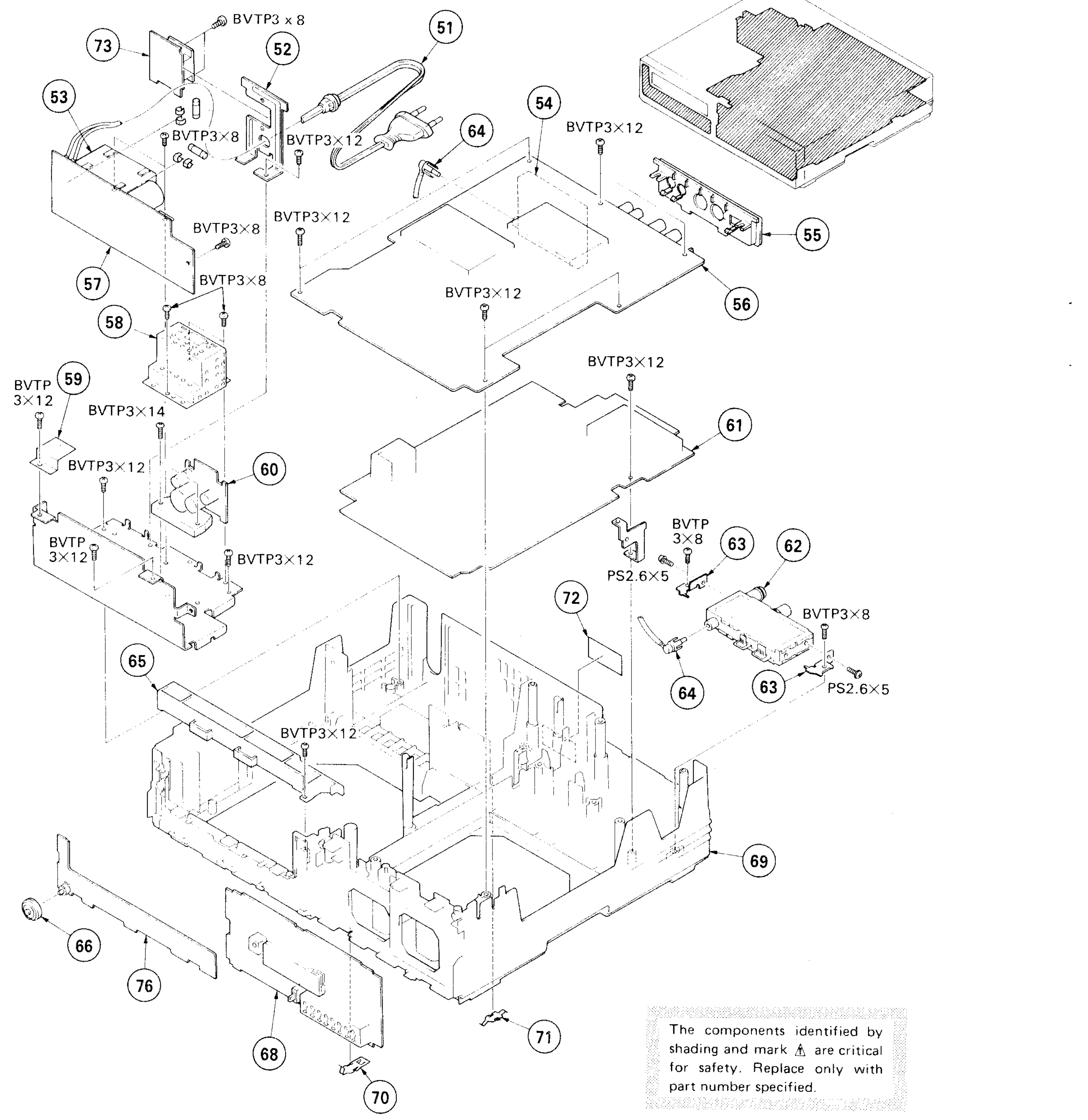
5-1. FRONT PANEL AND CABINET ASSEMBLIES



1
2
2
3
4
5
BVTP3×12

No.	Part No.	Description	Remark
1	X-3695-301-1	CASE ASSY, UPPER (SILVER)	
	X-3695-302-1	CASE ASSY, UPPER (GRAY)	
	X-3695-324-1	CASE ASSY, UPPER (BLACK)	
	X-3695-375-1	CASE ASSY, UPPER (RED)	
2	4-886-821-31	SCREW, M3 CASE STOPPER (SILVER, RED)	
	4-886-821-21	SCREW, M3 CASE STOPPER (GRAY, BLACK)	
3	*3-695-335-01	PLATE, BOTTOM	
4	X-3695-307-1	PANEL ASSY, FRONT (GRAY)	5
	X-3695-309-1	PANEL ASSY, FRONT (SILVER)	5
	X-3695-327-1	PANEL ASSY, FRONT (BLACK)	5
	X-3695-374-1	PANEL ASSY, FRONT (RED)	
5	3-695-329-41	DOOR, TIMER (SILVER)	
	3-695-329-51	DOOR, TIMER (GRAY)	
	3-695-329-91	DOOR, TIMER (BLACK)	
	3-695-329-12	DOOR, TIMER (RED)	

5-2. TUNER, TIMER AND POWER ASSEMBLIES

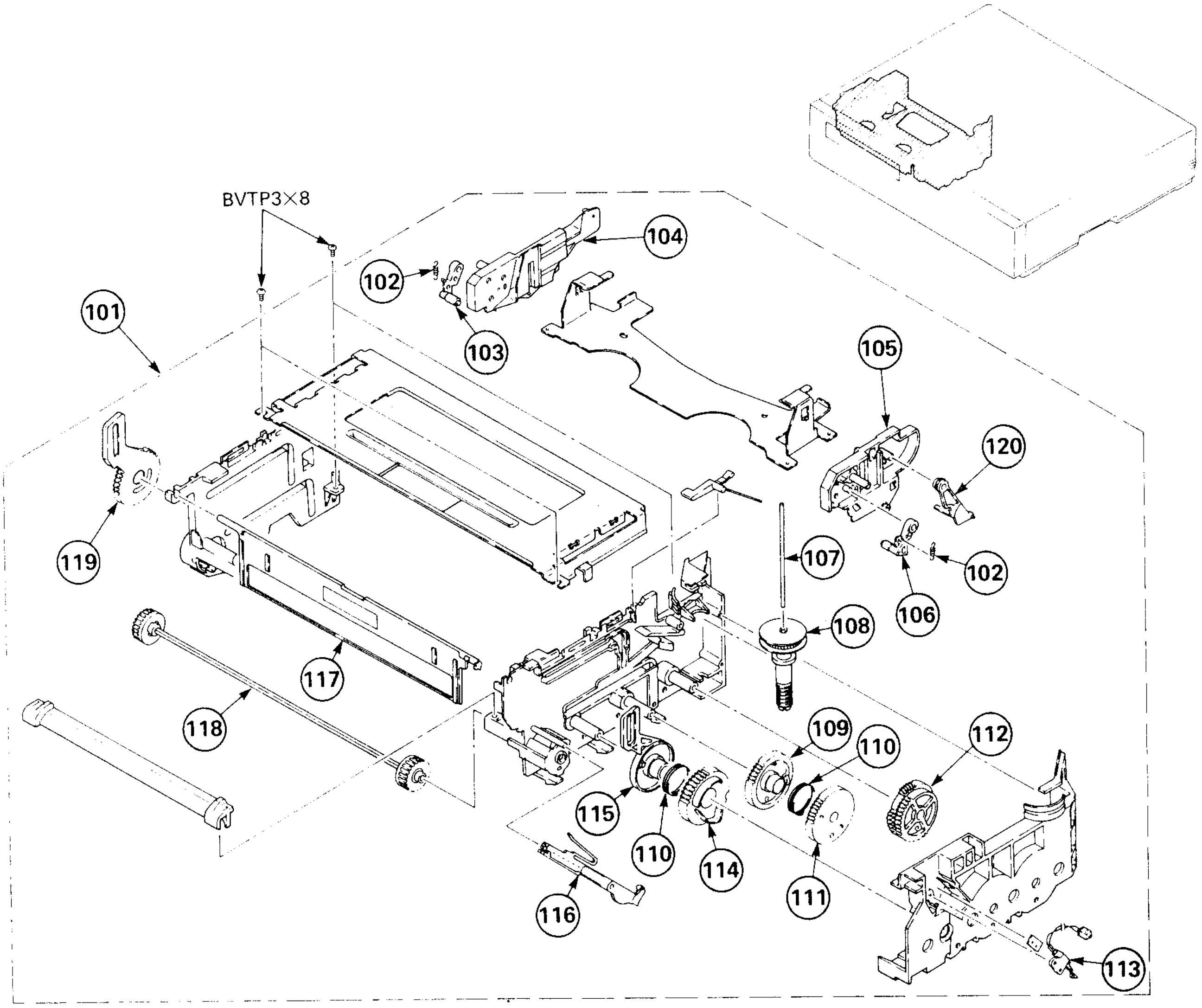


BVTP3 x 8
73
52
51
53
BVTP3×8
BVTP3×12
64
54
BVTP3×12
55
BVTP3×8
BVTP3×12
57
BVTP3×8
BVTP3×12
56
58
BVTP3×12
BVTP 3×12
59
BVTP3×14
61
BVTP3×12
60
BVTP 3×12
BVTP3×12
BVTP 3×8
63
62
PS2.6×5
72
BVTP3×8
65
64
63
PS2.6×5
BVTP3×12
69
66
76
68
71
70

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

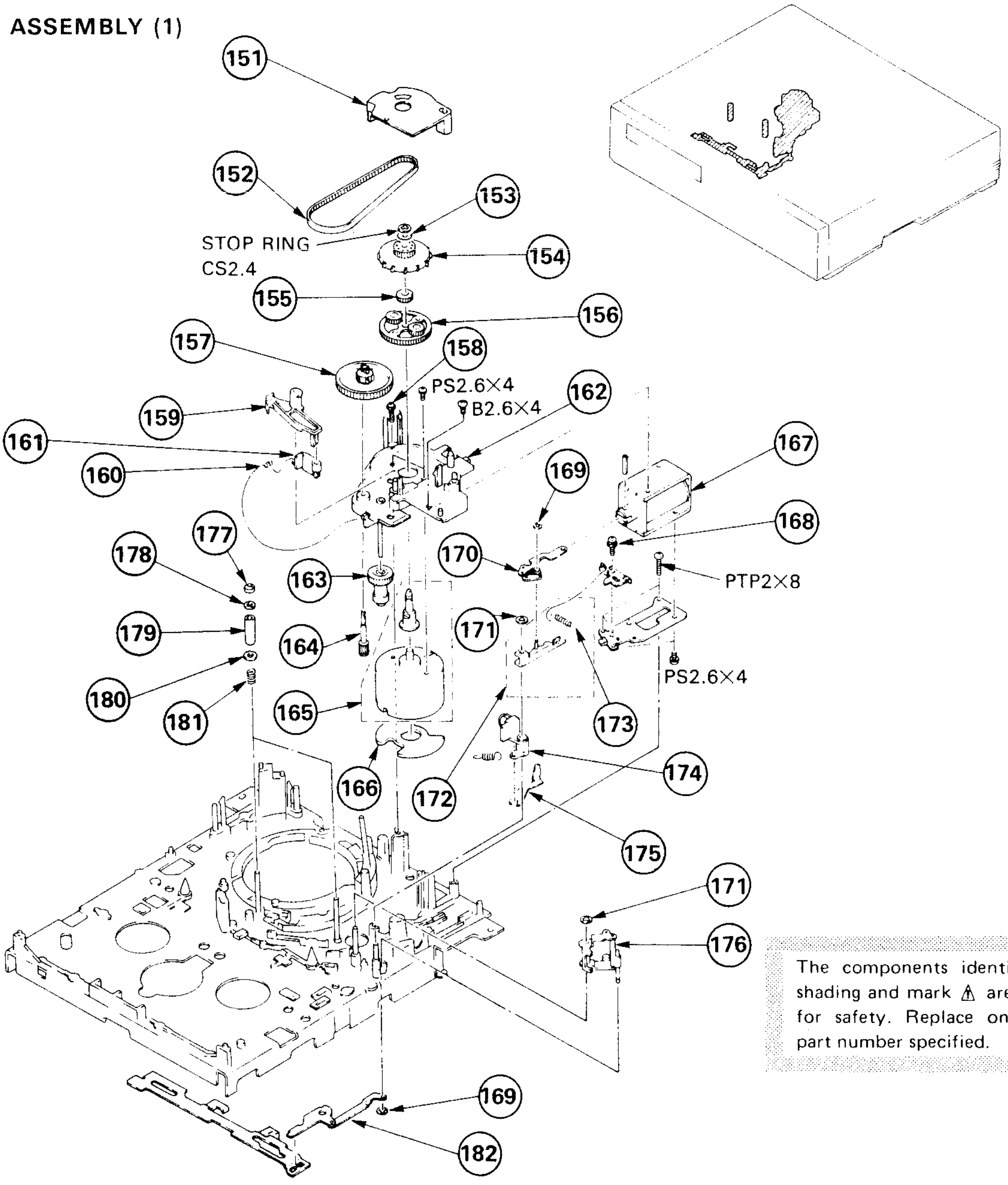
No.	Part No.	Description	Remark
51	⚠.1-558-097-12	CORD, POWER	
52	*3-695-315-11	BRACKET, CORD	
53	⚠.1-448-245-11	TRANSFORMER, POWER	
54	⚠.1-463-584-11	TUNER ET (BT-881A) (TU701)	
55	*3-695-314-01	PLATE, CONNECTOR	
56	*A-6711-694-A	VT-1 BOARD, COMPLETE	
57	*A-6729-221-A	PS-92 BOARD, COMPLETE	
58	*3-687-541-01	CASE, SHIELD	
59	3-687-592-01	SHEET, RADIATION	
60	*1-616-379-12	PS-93 BOARD	
61	*A-6715-291-A	SA-13 BOARD, COMPLETE	
62	⚠.1-464-481-11	BOOSTER MIXER, RF MODULATOR (RFU-829)	
63	*3-695-309-01	BRACKET, RBM	
64	*1-556-934-00	CABLE, PIN	
65	*3-695-347-01	RETAINER, UPPER CASE	
66	3-679-207-31	KNOB, TRACK CONTROL	
67	*1-616-382-12	FU-40 BOARD	
68	*A-6721-256-A	TT-13 BOARD, COMPLETE	
69	*3-695-334-21	FRAME, MOLD	
70	*3-695-305-01	PLATE (TT), GROUND	
71	*3-695-303-01	PLATE, GROUND	
72	*3-695-346-01	LABEL, MODEL NUMBER	
73	*1-616-381-13	VS-5 BOARD	

5-3. FRONT LOADING ASSEMBLIES



No.	Part No.	Description	Remark
101	A-6751-264-A	THREADING BLOCK ASSY, FRONT	102-120
102	3-684-258-01	SPRING, TENSION	
103	X-3684-125-1	RETAINER (LEFT) ASSY, CASSETTE	
104	*X-3693-803-1	PLATE ASSY, SIDE, LEFT, BASE	
105	*X-3684-118-1	PLATE ASSY, SIDE, RIGHT	
106	X-3684-124-1	RETAINER (RIGHT) ASSY, CASSETTE	
107	3-679-123-00	SHAFT, GEAR, WORM	
108	X-3693-804-1	GEAR ASSY, WORM	
109	3-684-111-01	GEAR (B), LIMITER	
110	3-684-115-01	SPRING	
111	3-684-109-01	GEAR (A), LIMITER	
112	X-3684-123-1	GEAR ASSY, DRIVING	
113	1-554-840-11	SWITCH, LEAF (CASSETTE IN) (S904)	
114	3-684-163-01	GEAR, DRIVING ARM	
115	3-684-165-01	ARM (RIGHT), DRIVING	
116	*3-693-854-01	ARM, SWITCHING, DOOR	
117	3-684-168-06	DOOR	
118	X-3684-116-1	SHAFT ASSY, MIDWAY GEAR	
119	*3-684-166-01	ARM (LEFT), DRIVING	
120	*3-684-108-01	ARM, LID OPEN	

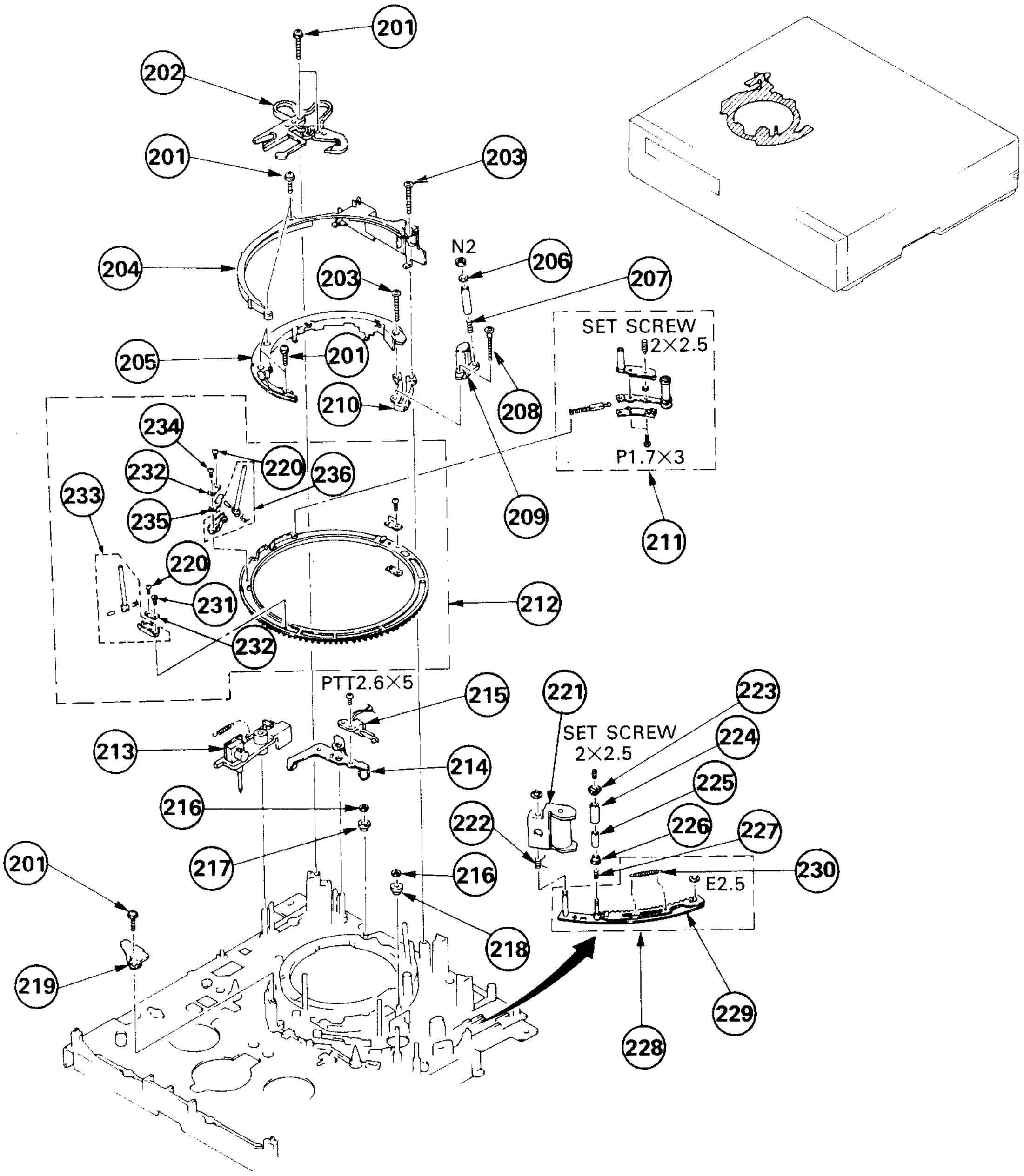
5-4. CHASSIS ASSEMBLY (1)


151
152
153
STOP RING
CS2.4
154
155
156
157
158
PS2.6×4
B2.6×4
162
159
161
160
167
169
168
177
178
170
PTP2X8
163
179
171
164
PS2.6×4
180
181
165
173
174
166
172
175
171
176
169
182

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
151	*3-693-866-01	HOLDER, GEAR, PLANET	
152	3-684-264-01	BELT, TIMING	
153	3-683-454-01	WASHER, POLYETHYLENE	
154	3-684-178-01	GEAR, INTERNAL	
155	3-679-104-05	GEAR	
156	X-3679-111-0	CARRIER ASSY	
157	3-679-115-00	GEAR (LARGE), LOADING	
158	3-669-480-11	+ PTPWH 2	
159	3-684-167-01	ARM, STOPPER	
160	3-684-227-01	SPRING, TENSION	
161	3-684-116-01	LIMITER, STOPPER	
162	X-3693-809-1	CHASSIS ASSY, PLANET GEAR	
163	X-3669-321-0	GEAR (C) ASSY	
164	3-679-114-00	GEAR (SMALL), LOADING	
165	X-3679-268-1	MOTOR ASSY, L (LOADING/THREADING) (M904)	
166	*1-614-597-11	LM-16 BOARD	
167	⚠1-454-349-61	SOLENOID, PLUNGER (PINCH) (PM901)	
168	3-669-607-00	+PSW (SMALL ROUND) 2.6	
169	3-669-465-00	WASHER (1.5), STOPPER	
170	X-3684-109-1	ARM ASSY, PINCH SOLENOID	
171	3-669-595-00	WASHER (2), STOPPER	
172	*X-3684-112-1	ARM ASSY, PINCH LIMITER	173
173	3-515-170-00	SPRING, TENSION	
174	X-3693-830-1	SENSOR BLOCK ASSY, T (L902)	
175	*3-684-119-01	LINK, TAKE-UP SENSOR	
176	*X-3693-807-1	ARM ASSY, PRESS, PINCH	
177	3-669-318-21	NUT, ADJUSTMENT, GUIDE	
178	3-684-135-01	WASHER (UPPER), GUIDE, #7, 8	
179	3-693-830-01	SLEEVE, GUIDE, #7, #8	
180	3-693-831-01	WASHER, GUIDE	
181	3-693-832-01	SPRING (#7, #8), COMPRESSION	
182	*X-3684-114-1	LEVER ASSY, COMMUNICATION	

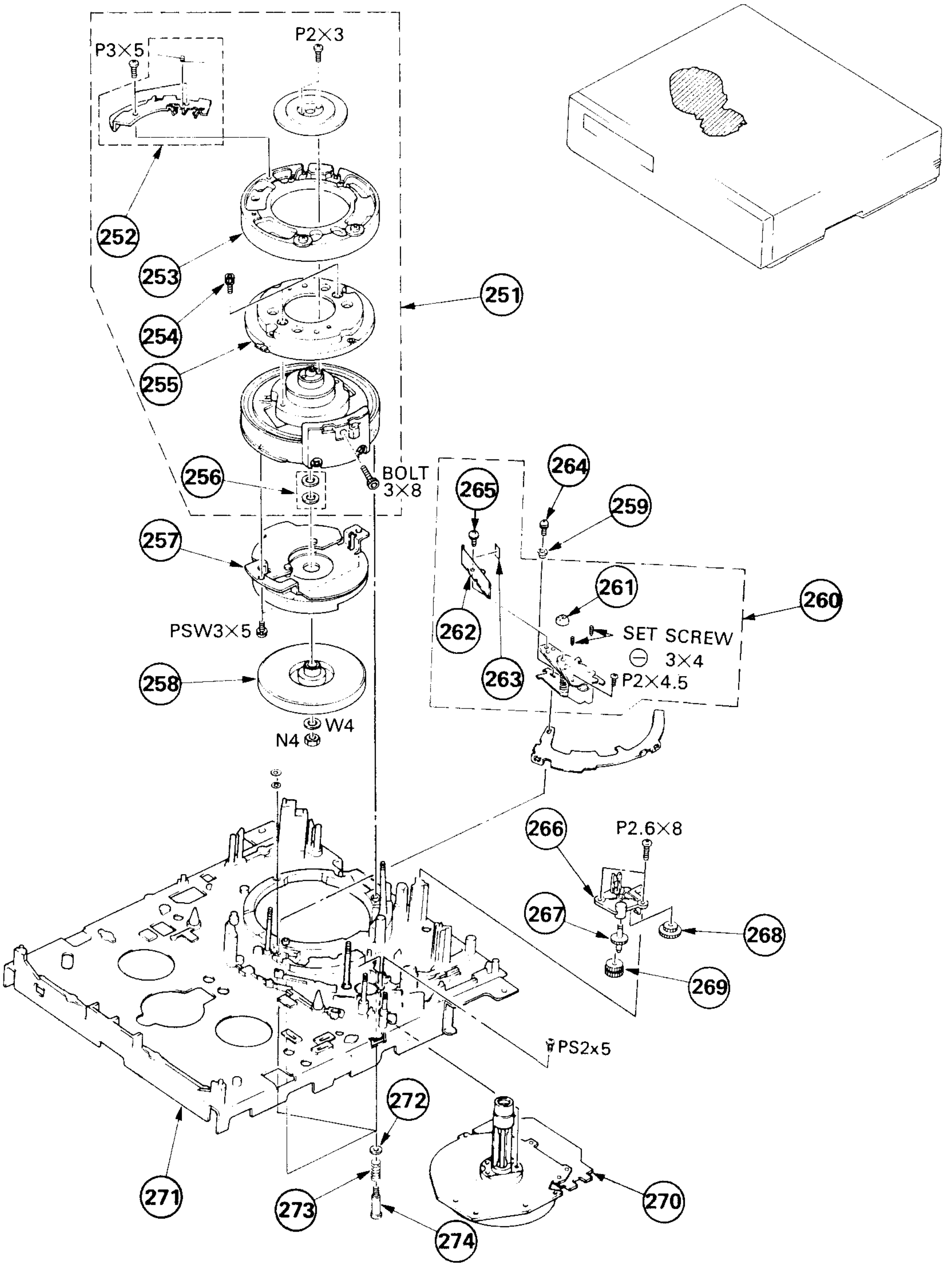
5-5. CHASSIS ASSEMBLY (2)



201
202
201
203
204
203
N2
206
207
SET SCREW
φ2X2.5
205
201
210
208
P1.7X3
234
232
220
236
233
235
209
211
220
231
212
232
PTT2.6X5
215
221
223
SET SCREW
2X2.5
224
213
214
225
216
222
226
227
201
217
216
230
E2.5
218
219
229
228

No.	Part No.	Description	Remark
201	3-669-480-11	+ PTPWH 2	
202	3-693-867-01	PLATE (2&3), ADJUSTMENT	
203	3-669-466-21	SCREW (M 2.6)	
204	3-684-217-04	GUIDE (2), SHUTTLE	
205	*3-679-290-00	GUIDE (1-YA), SHUTTLE	
206	3-679-910-00	FLANGE (S), GUIDE, NUMBER 6	
207	3-669-615-00	SPRING, COMPRESSION	
208	3-669-606-00	SCREW (2.6)	
209	8-825-508-10	HEAD, FE	
210	*X-3679-263-1	BASE ASSY, SLANT	
211	A-6750-158-B	SHUTTLE (2) BLOCK ASSY	
212	X-3684-178-1	RING (CF) ASSY, THREADING, S	220, 231-236
213	X-3693-829-1	SENSOR BLOCK ASSY, S (L901)	
214	*X-3684-130-1	ARM ASSY, LOCK	
215	1-554-840-11	SWITCH, LEAF (THREADING END) (S903)	
216	3-669-465-00	WASHER (1.5), STOPPER	
217	3-669-360-00	ROLLER, RING	
218	3-669-597-00	ROLLER (B), RING	
219	3-669-476-04	PLATE, GUIDE	
220	3-669-478-00	SCREW (1X3), TAPPING	
221	X-3679-264-1	ARM ASSY, PINCH ROLLER	
222	3-683-441-01	SPRING	
223	3-676-650-00	FLANGE (UPPER) (#9), GUIDE	
224	3-676-649-11	ROLLER (#9), GUIDE	
225	3-672-559-00	SLEEVE, GUIDE	
226	3-672-558-00	FLANGE (LOWER) (#9), GUIDE	
227	3-669-452-00	SPRING, COMPRESSION	
228	A-6750-165-A	GEAR ASSY, SLIDER	229, 230
229	*X-3679-265-1	SLIDER ASSY (2), T	
230	3-549-014-00	SPRING, TENSION	
231	3-672-586-00	SCREW (1.4X3), TAPPING	
232	*3-669-472-02	RETAINER, SPRING, LEAF	
233	*X-3669-429-0	HOLDER BLOCK ASSY, #2 GUIDE	
234	3-669-479-11	SCREW (1.4X3.5), TAPPING	
235	3-672-583-00	SPRING	
236	*X-3669-430-0	HOLDER BLOCK ASSY, #3 GUIDE	

5-6. DRUM ASSEMBLY


P3×5
P2×3
252
253
254
255
256
BOLT 3×8
251
257
PSW3×5
258
W4
N4
264
265
259
261
262
263
SET SCREW ⊖ 3×4
P2×4.5
260
266
P2.6×8
267
268
269
PS2x5
272
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273
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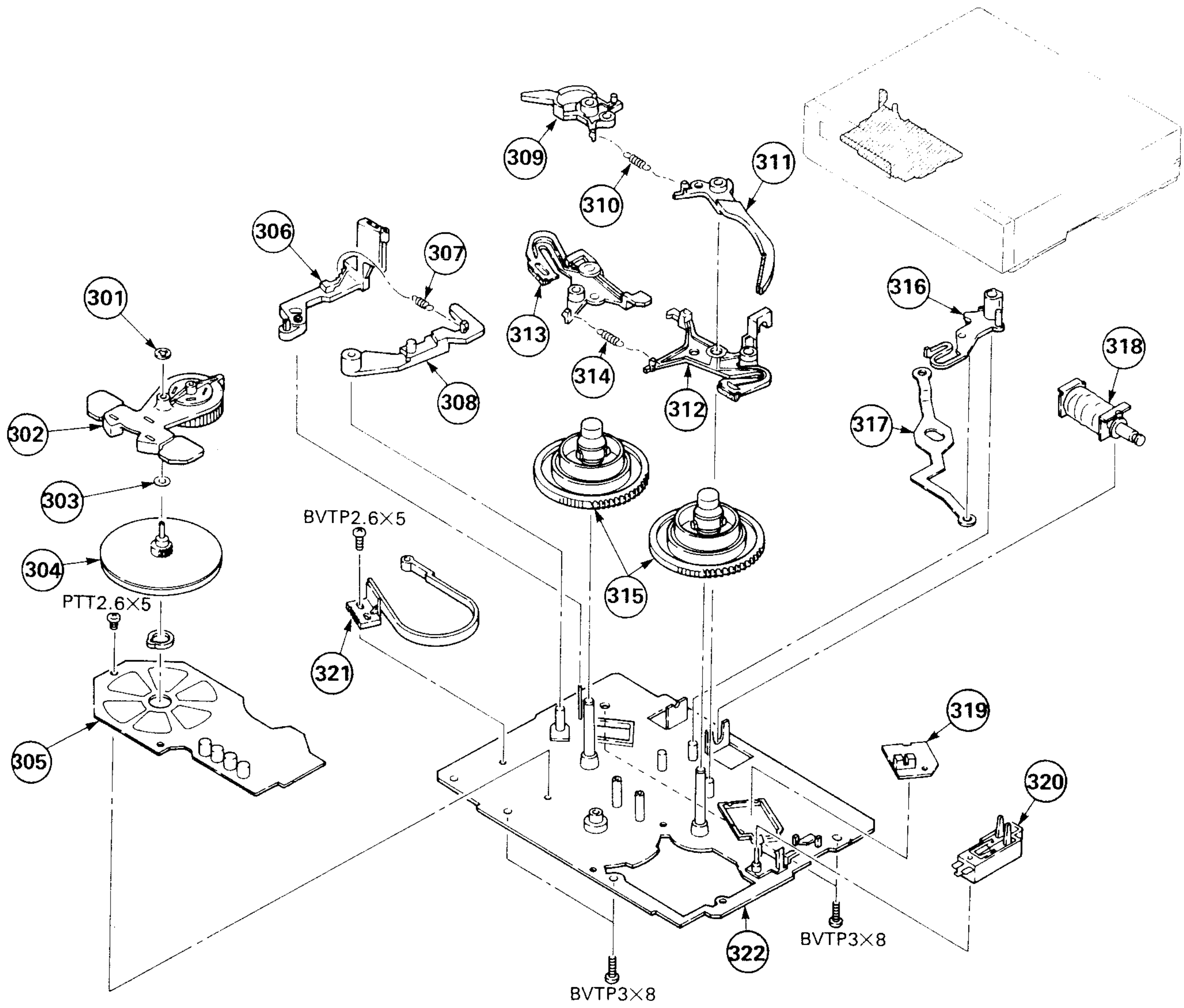
270

No.	Part No.	Description	Remark
251	A-6050-394-A	DRUM ASSY (DSH-79A-R)	252-256
252	A-6760-066-B	SPRING ASSY, TAPE RETAINER	
253	A-6760-119-A	DRUM ASSY, UPPER	
254	3-669-157-00	BOLT (WASHER) (2.6X8)	
255	A-6762-264-A	DISK ASSY (DSR-79-R)	
256	X-3669-105-0	SPACER BLOCK ASSY	
257	X-2621-204-2	D STATOR ASSY	
258	X-2621-202-0	D ROTOR ASSY	
259	3-684-247-01	BUSHING, ACE	
260	A-6761-096-A	ACE ASSY	261-263,265
261	*3-684-246-02	NUT, ADJUSTMENT, HEIGHT, ACE	
262	3-693-895-01	PROTECTOR (S)	
263	3-693-904-01	SHEET (P), INSULATING	
264	3-693-439-01	SCREW (P2.6X12), (+)	
265	3-693-439-11	SCREW (P2.6X5), (+)	
266	*X-3693-805-1	CHASSIS ASSY, DRIVE GEAR	
267	*X-3693-806-1	GEAR (F) ASSY	
268	3-669-337-00	GEAR (D)	
269	3-669-338-00	GEAR (E)	
270	8-838-070-01	MOTOR, DC (BHF-1907B) (CAPSTAN MOTOR) (M902)	
271	*X-3693-816-3	CHASSIS ASSY, MECHANICAL	
272	3-669-600-11	WASHER, FLAT (3.5)	
273	3-429-123-00	SPRING	
274	3-669-302-00	SCREW, FITTING	

5-7. REEL BLOCK ASSEMBLY


309
310
311
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307
313
301
316
318
302
314
308
312
317
303
BVTP2.6×5
304
315
PTT2.6×5
321
319
305
320
322
BVTP3×8
BVTP3×8

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
301	3-669-595-00	WASHER (2), STOPPER	
302	A-6759-074-A	ARM BLOCK ASSY, PENDULUM	
303	3-679-318-00	WASHER, PENDULUM ARM	
304	X-2622-205-1	ROTOR ASSY, R	
305	*A-4910-063-A	R STATOR (REEL MOTOR) BOARD, COMPLETE (M903)	
306	X-3684-121-1	LEVER ASSY, TENSION REGULATOR	
307	3-685-749-01	SPRING, TENSION	
308	3-693-869-01	LEVER, FUNCTION	
309	3-684-192-01	ARM, BRAKE, SUPPLY SOFT	
310	3-684-235-01	SPRING, TENSION	
311	X-3684-137-1	BRAKE ASSY, T SOFT	
312	X-3684-108-1	BRAKE ASSY, TAKE-UP	
313	X-3684-107-1	BRAKE ASSY, SUPPLY	
314	3-685-772-01	SPRING, TENSION	
315	X-3684-106-1	TABLE ASSY, REEL	
316	3-684-193-01	ARM, PENDULUM STOPPER	
317	*3-684-183-01	LINK, L	
318	⚠1-454-371-31	SOLENOID, PLUNGER (BRAKE) (PM902)	
319	*1-613-233-12	RD-21 BOARD	
320	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF/CASSETTE DOWN) (S901)	
321	X-3679-120-0	BAND ASSY, TENSION REGULATOR	
322	*X-3693-813-1	CHASSIS ASSY, SUB	

5-8. HARDWARE LIST

SCREW

7-621-773-86	SCREW +B 2.6X4
7-627-553-58	SCREW, PRECISION +P 2X4.5
7-627-554-07	SCREW, PRECISION +P 2X2.2
7-628-253-15	SCREW +PS 2X5
7-628-253-95	SCREW +PS 2.6X4
7-628-254-05	SCREW +PS 2.6X5
7-685-134-14	SCREW +P 2.6X8 TYPE2 NON-SLIT
7-685-646-71	SCREW +BVTP 3X8 TYPE2 IT-3
7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
7-685-646-81	SCREW +BVTP 3X8 TYPE2
7-685-646-89	SCREW +BVTP 3X8 TYPE2
7-685-648-71	SCREW +BVTP 3X12 TYPE2 IT-3
7-685-648-81	SCREW +BVTP 3X12 TYPE2
7-685-649-71	SCREW +BVTP 3X14 TYPE2 IT-3
7-685-649-81	SCREW +BVTP 3X14 TYPE2
7-685-791-04	SCREW +PTT 2.6X5 (S)
7-685-791-04	SCREW +BVTT 2.6X5 (S)

NUT

7-622-205-05	NUT M2 TYPE2

STOP RING

7-624-190-61	STOP RING 2.4, TYPE-CS

SET-SCREW

7-683-174-21	SET-SCREW, SLOT 3X4 CONE POINT

TAPPING

7-685-105-14	TPG +P 2X8, TYPE 2, NON-SLIT

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description			Remark
	A-4910-063-A	R STATOR (REEL MOTOR) BOARD, COMPLETE **************************************			
	*1-560-461-00	PIN, CONNECTOR 5P			
		CAPACITOR			
C1	1-123-821-00	ELECT	47MF	20%	16V
C2	1-123-821-00	ELECT	47MF	20%	16V
C3	1-123-821-00	ELECT	47MF	20%	16V
C4	1-123-821-00	ELECT	47MF	20%	16V
		DIODE			
H1	8-719-800-31	DIODE THS103A-1			
H2	8-719-800-31	DIODE THS103A-1			
		IC			
IC1	8-759-801-97	IC LB1615			
		RESISTOR			
R1	1-247-823-00	CARBON	470	5%	1/6W
R2	1-249-429-11	CARBON	10K	5%	1/6W
R3	1-249-437-11	CARBON	47K	5%	1/6W
R4	1-249-437-11	CARBON	47K	5%	1/6W
R5	1-249-437-11	CARBON	47K	5%	1/6W
R6	1-249-437-11	CARBON	47K	5%	1/6W

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Ref.No	Part No.	Description			Remark
	*A-6711-694-A	VT-1 BOARD, COMPLETE *********************			
		FILTER			
BPF001	1-235-098-00	FILTER, BAND PASS			
		CAPACITOR			
C004	1-123-306-00	ELECT	47MF	20%	10V
C005	1-123-356-00	ELECT	10MF	20%	16V
C006	1-102-973-00	CERAMIC	100PF	5%	50V
C007	1-102-977-00	CERAMIC	200PF	5%	50V
C008	1-101-004-00	CERAMIC	0.01MF		50V
C009	1-101-004-00	CERAMIC	0.01MF		50V
C010	1-130-471-00	MYLAR	0.001MF	5%	50V
C011	1-161-043-00	CERAMIC	0.0022MF	10%	25V
C012	1-130-491-00	MYLAR	0.047MF	5%	50V
C013	1-123-330-00	ELECT	22MF	20%	16V
C014	1-162-560-11	CERAMIC	0.047MF		16V
C015	1-102-948-21	CERAMIC	11PF	5%	50V
C016	1-162-561-11	CERAMIC	0.1MF		16V
C017	1-101-361-00	CERAMIC	150PF	5%	50V
C018	1-162-560-11	CERAMIC	0.047MF		16V
C019	1-123-330-00	ELECT	22MF	20%	16V
C020	1-123-318-00	ELECT	33MF	20%	16V
C021	1-162-560-11	CERAMIC	0.047MF		16V
C022	1-123-356-00	ELECT	10MF	20%	16V
C023	1-123-306-00	ELECT	47MF	20%	10V
C024	1-162-561-11	CERAMIC	0.1MF		16V
C025	1-123-369-00	ELECT	4.7MF	20%	25V
C026	1-123-380-00	ELECT	1MF	20%	50V
C027	1-123-356-00	ELECT	10MF	20%	16V
C028	1-102-973-00	CERAMIC	100PF	5%	50V
C029	1-101-004-00	CERAMIC	0.01MF		50V
C030	1-162-560-11	CERAMIC	0.047MF		16V
C031	1-101-361-00	CERAMIC	150PF	5%	50V
C032	1-101-004-00	CERAMIC	0.01MF		50V
C033	1-162-560-11	CERAMIC	0.047MF		16V
C034	1-101-004-00	CERAMIC	0.01MF		50V
C036	1-101-004-00	CERAMIC	0.01MF		50V
C037	1-123-356-00	ELECT	10MF	20%	16V
C038	1-101-004-00	CERAMIC	0.01MF		50V
C039	1-102-981-00	CERAMIC	300PF	5%	50V
C040	1-102-948-21	CERAMIC	11PF	5%	50V
C041	1-161-057-00	CERAMIC	0.033MF	10%	25V
C042	1-102-822-00	CERAMIC	390PF	5%	50V
C043	1-162-560-11	CERAMIC	0.047MF		16V
C044	1-102-950-21	CERAMIC	13PF	5%	50V
C045	1-101-882-00	CERAMIC	51PF	5%	50V
C046	1-101-882-00	CERAMIC	51PF	5%	50V
C047	1-102-950-21	CERAMIC	13PF	5%	50V
C048	1-123-369-00	ELECT	4.7MF	20%	25V
C049	1-102-529-00	CERAMIC	100PF	5%	50V
C051	1-102-851-00	CERAMIC	15PF	5%	50V
C052	1-123-369-00	ELECT	4.7MF	20%	25V
C053	1-102-976-00	CERAMIC	180PF	5%	50V
C054	1-102-823-00	CERAMIC	430PF	5%	50V
C055	1-102-821-00	CERAMIC	360PF	5%	50V
C056	1-102-851-00	CERAMIC	15PF	5%	50V
C057	1-162-560-11	CERAMIC	0.047MF		16V
C058	1-102-520-00	CERAMIC	39PF	5%	50V
C059	1-102-852-00	CERAMIC	47PF	5%	50V
C060	1-102-820-00	CERAMIC	330PF	5%	50V
C061	1-102-823-00	CERAMIC	430PF	5%	50V
C062	1-102-824-00	CERAMIC	470PF	5%	50V
C063	1-102-976-00	CERAMIC	180PF	5%	50V
C064	1-162-560-11	CERAMIC	0.047MF		16V
C065	1-162-560-11	CERAMIC	0.047MF		16V
C072	1-162-560-11	CERAMIC	0.047MF		16V
C073	1-102-953-00	CERAMIC	18PF	5%	50V
C074	1-101-004-00	CERAMIC	0.01MF		50V
C077	1-123-380-00	ELECT	1MF	20%	50V
C078	1-101-004-00	CERAMIC	0.01MF		50V
C080	1-162-560-11	CERAMIC	0.047MF		16V
C081	1-123-369-00	ELECT	4.7MF	20%	25V
C082	1-123-380-00	ELECT	1MF	20%	50V
C083	1-161-040-00	CERAMIC	0.0012MF	10%	25V
C084	1-101-004-00	CERAMIC	0.01MF		50V
C085	1-101-004-00	CERAMIC	0.01MF		50V

Ref.No	Part No.	Description			Remark	Ref.No	Part No.	Description			Remark
C086	1-123-306-00	ELECT	47MF	20%	10V	C142	1-123-356-00	ELECT	10MF	20%	16V
C088	1-102-521-00	CERAMIC	43PF	5%	50V	C143	1-162-560-11	CERAMIC	0.047MF		16V
C089	1-102-965-00	CERAMIC	39PF	5%	50V	C144	1-162-560-11	CERAMIC	0.047MF		16V
C090	1-123-382-00	ELECT	3.3MF	20%	50V	C145	1-162-560-11	CERAMIC	0.047MF		16V
C091	1-130-483-00	MYLAR	0.01MF	5%	50V	C146	1-102-960-00	CERAMIC	24PF	5%	50V
C093	1-123-380-00	ELECT	1MF	20%	50V	C147	1-102-960-00	CERAMIC	24PF	5%	50V
C094	1-102-820-00	CERAMIC	330PF	5%	50V	C148	1-162-560-11	CERAMIC	0.047MF		16V
C095	1-130-471-00	MYLAR	0.001MF	5%	50V	C149	1-162-560-11	CERAMIC	0.047MF		16V
C096	1-130-047-00	FILM	180PF	5%	50V	C150	1-162-560-11	CERAMIC	0.047MF		16V
C097	1-101-004-00	CERAMIC	0.01MF		50V	C151	1-123-379-00	ELECT	0.47MF	20%	50V
C098	1-102-361-00	CERAMIC	0.0039MF	10%	50V	C153	1-123-356-00	ELECT	10MF	20%	16V
C099	1-102-525-00	CERAMIC	68PF	5%	50V	C154	1-162-561-11	CERAMIC	0.1MF		16V
C100	1-102-525-00	CERAMIC	68PF	5%	50V	C156	1-123-356-00	ELECT	10MF	20%	16V
C101	1-101-004-00	CERAMIC	0.01MF		50V	C157	1-130-495-00	MYLAR	0.1MF	5%	50V
C102	1-102-518-00	CERAMIC	33PF	5%	50V	C158	1-123-356-00	ELECT	10MF	20%	16V
C103	1-102-971-00	CERAMIC	82PF	5%	50V	C159	1-101-004-00	CERAMIC	0.01MF		50V
C104	1-102-977-00	CERAMIC	200PF	5%	50V	C160	1-101-004-00	CERAMIC	0.01MF		50V
C105	1-102-963-00	CERAMIC	33PF	5%	50V	C161	1-123-307-00	ELECT	100MF	20%	6.3V
C106	1-161-013-00	CERAMIC	0.01MF	10%	25V	C162	1-162-560-11	CERAMIC	0.047MF		16V
C107	1-123-330-00	ELECT	22MF	20%	16V	C163	1-102-852-00	CERAMIC	47PF	5%	50V
C108	1-123-330-00	ELECT	22MF	20%	16V	C164	1-102-852-00	CERAMIC	47PF	5%	50V
C109	1-161-013-00	CERAMIC	0.01MF	10%	25V	C165	1-123-379-00	ELECT	0.47MF	20%	50V
C110	1-123-380-00	ELECT	1MF	20%	50V	C166	1-130-495-00	MYLAR	0.1MF	5%	50V
C111	1-161-024-00	CERAMIC	0.082MF	10%	25V	C167	1-161-013-00	CERAMIC	0.01MF	10%	25V
C112	1-102-525-00	CERAMIC	68PF	5%	50V	C168	1-123-356-00	ELECT	10MF	20%	16V
C113	1-101-974-00	CERAMIC	20PF	5%	50V	C169	1-102-977-00	CERAMIC	200PF	5%	50V
C114	1-101-004-00	CERAMIC	0.01MF		50V	C170	1-101-004-00	CERAMIC	0.01MF		50V
C115	1-102-524-00	CERAMIC	62PF	5%	50V	C171	1-101-004-00	CERAMIC	0.01MF		50V
C116	1-102-816-00	CERAMIC	120PF	5%	50V	C172	1-102-973-00	CERAMIC	100PF	5%	50V
C117	1-123-617-00	ELECT	10MF	20%	16V	C173	1-102-824-00	CERAMIC	470PF	5%	50V
C118	1-102-816-00	CERAMIC	120PF	5%	50V	C174	1-162-561-11	CERAMIC	0.1MF		16V
C119	1-101-361-00	CERAMIC	150PF	5%	50V	C175	1-123-307-00	ELECT	100MF	20%	6.3V
C120	1-162-560-11	CERAMIC	0.047MF		16V	C176	1-162-560-11	CERAMIC	0.047MF		16V
C121	1-101-059-21	CERAMIC	510PF	5%	50V	C177	1-161-059-00	CERAMIC	0.047MF	10%	25V
C122	1-101-882-00	CERAMIC	51PF	5%	50V	C178	1-161-059-00	CERAMIC	0.047MF	10%	25V
C123	1-101-004-00	CERAMIC	0.01MF		50V	C179	1-123-356-00	ELECT	10MF	20%	16V
C124	1-101-004-00	CERAMIC	0.01MF		50V	C180	1-123-356-00	ELECT	10MF	20%	16V
C125	1-101-004-00	CERAMIC	0.01MF		50V	C181	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C126	1-101-882-00	CERAMIC	51PF	5%	50V	C182	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C128	1-101-004-00	CERAMIC	0.01MF		50V	C183	1-130-476-00	MYLAR	0.0027MF	5%	50V
C129	1-161-013-00	CERAMIC	0.01MF	10%	25V	C184	1-123-380-00	ELECT	1MF	20%	50V
C130	1-101-361-00	CERAMIC	150PF	5%	50V	C185	1-123-307-00	ELECT	100MF	20%	10V
C131	1-130-472-00	MYLAR	0.0012MF	5%	50V	C186	1-162-560-11	CERAMIC	0.047MF		16V
C132	1-123-382-00	ELECT	3.3MF	20%	50V	C187	1-123-306-00	ELECT	47MF	20%	10V
C133	1-130-471-00	MYLAR	0.001MF	5%	50V	C188	1-123-299-00	ELECT	1000MF	20%	6.3V
C134	1-161-045-00	CERAMIC	0.0033MF	10%	25V	C189	1-123-306-00	ELECT	47MF	20%	10V
C135	1-123-356-00	ELECT	10MF	20%	16V	C190	1-162-560-11	CERAMIC	0.047MF		16V
C136	1-162-560-11	CERAMIC	0.047MF		16V	C191	1-123-306-00	ELECT	47MF	20%	10V
C137	1-123-330-00	ELECT	22MF	20%	16V	C192	1-161-025-00	CERAMIC	0.1MF	10%	25V
C138	1-123-356-00	ELECT	10MF	20%	16V	C193	1-123-822-00	ELECT	47MF	20%	10V
C139	1-162-560-11	CERAMIC	0.047MF		16V	C194	1-162-561-11	CERAMIC	0.1MF		16V
C140	1-123-306-00	ELECT	47MF	20%	10V	C195	1-162-560-11	CERAMIC	0.047MF		16V
C141	1-162-560-11	CERAMIC	0.047MF		16V	C196	1-161-025-00	CERAMIC	0.1MF	10%	25V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C197	1-162-561-11	CERAMIC	0.1MF		16V
C200	1-101-004-00	CERAMIC	0.01MF		50V
C301	1-101-004-00	CERAMIC	0.01MF		50V
C302	1-161-043-00	CERAMIC	0.0022MF	10%	25V
C303	1-102-516-00	CERAMIC	27PF	5%	50V
C304	1-101-004-00	CERAMIC	0.01MF		50V
C305	1-101-004-00	CERAMIC	0.01MF		50V
C306	1-101-004-00	CERAMIC	0.01MF		50V
C307	1-101-004-00	CERAMIC	0.01MF		50V
C308	1-101-004-00	CERAMIC	0.01MF		50V
C309	1-102-523-00	CERAMIC	56PF	5%	50V
C310	1-123-306-00	ELECT	47MF	20%	10V
C311	1-101-004-00	CERAMIC	0.01MF		50V
C312	1-101-004-00	CERAMIC	0.01MF		50V
C313	1-101-004-00	CERAMIC	0.01MF		50V
C314	1-123-306-00	ELECT	47MF	20%	10V
C315	1-123-369-00	ELECT	4.7MF	20%	25V
C316	1-130-488-00	MYLAR	0.027MF	5%	50V
C317	1-123-306-00	ELECT	47MF	20%	10V
C318	1-101-004-00	CERAMIC	0.01MF		50V
C401	1-123-381-00	ELECT	2.2MF	20%	50V
C402	1-101-001-00	CERAMIC	0.001MF		50V
C403	1-101-001-00	CERAMIC	0.001MF		50V
C404	1-101-004-00	CERAMIC	0.01MF		50V
C405	1-123-330-00	ELECT	22MF	20%	16V
C406	1-123-330-00	ELECT	22MF	20%	16V
C407	1-102-962-21	CERAMIC	30PF	5%	50V
C408	1-101-888-00	CERAMIC	68PF	5%	50V
C409	1-123-381-00	ELECT	2.2MF	20%	50V
C410	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C411	1-101-005-00	CERAMIC	0.022MF		50V
C412	1-123-318-00	ELECT	33MF	20%	16V
C413	1-123-369-00	ELECT	4.7MF	20%	25V
C414	1-123-356-00	ELECT	10MF	20%	16V
C415	1-123-369-00	ELECT	4.7MF	20%	25V
C416	1-102-948-21	CERAMIC	11PF	5%	50V
C417	1-102-948-21	CERAMIC	11PF	5%	50V
C418	1-102-965-00	CERAMIC	39PF	5%	50V
C419	1-123-356-00	ELECT	10MF	20%	16V
C420	1-123-369-00	ELECT	4.7MF	20%	25V
C421	1-162-560-11	CERAMIC	0.047MF		16V
C501	1-101-004-00	CERAMIC	0.01MF		50V
C502	1-101-004-00	CERAMIC	0.01MF		50V
C503	1-101-004-00	CERAMIC	0.01MF		50V
C504	1-101-005-00	CERAMIC	0.022MF		50V
C505	1-102-822-00	CERAMIC	390PF	5%	50V
C506	1-162-560-11	CERAMIC	0.047MF		16V
C507	1-123-318-00	ELECT	33MF	20%	16V
C508	1-101-004-00	CERAMIC	0.01MF		50V
C601	1-123-356-00	ELECT	10MF	20%	16V
C602	1-101-004-00	CERAMIC	0.01MF		50V
C603	1-101-004-00	CERAMIC	0.01MF		50V
C604	1-101-004-00	CERAMIC	0.01MF		50V
C605	1-162-561-11	CERAMIC	0.1MF		16V
C606	1-101-004-00	CERAMIC	0.01MF		50V
C607	1-101-004-00	CERAMIC	0.01MF		50V
C608	1-123-616-00	ELECT	4.7MF	20%	25V
C609	1-101-004-00	CERAMIC	0.01MF		50V
C610	1-101-004-00	CERAMIC	0.01MF		50V
C613	1-102-973-00	CERAMIC	100PF	5%	50V
C614	1-102-120-00	CERAMIC	0.0018MF	10%	50V
C617	1-123-307-00	ELECT	100MF	20%	10V
C618	1-101-884-00	CERAMIC	56PF	5%	50V
C619	1-102-820-00	CERAMIC	330PF	5%	50V
C620	1-123-356-00	ELECT	10MF	20%	16V
C622	1-102-980-00	CERAMIC	270PF	5%	50V
C701	1-161-013-00	CERAMIC	0.01MF	10%	25V
C702	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C703	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C704	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C705	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C706	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C707	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C708	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C709	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C710	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C711	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C712	1-102-504-00	CERAMIC	4PF	0.25PF	50V
C713	1-102-504-00	CERAMIC	4PF	0.25PF	50V
C714	1-102-518-00	CERAMIC	33PF	5%	50V
C715	1-102-529-00	CERAMIC	100PF	5%	50V
C716	1-102-529-00	CERAMIC	100PF	5%	50V
C717	1-102-518-00	CERAMIC	33PF	5%	50V
C718	1-101-004-00	CERAMIC	0.01MF		50V
C719	1-123-318-00	ELECT	33MF	20%	16V
C720	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C721	1-123-380-00	ELECT	1MF	20%	50V
C722	1-101-004-00	CERAMIC	0.01MF		50V
C723	1-123-318-00	ELECT	33MF	20%	16V
C724	1-102-978-00	CERAMIC	220PF	5%	50V
C725	1-123-310-00	ELECT	470MF	20%	10V
C726	1-102-959-00	CERAMIC	22PF	5%	50V
C727	1-102-959-00	CERAMIC	22PF	5%	50V
C728	1-101-004-00	CERAMIC	0.01MF		50V
C729	1-101-004-00	CERAMIC	0.01MF		50V
C730	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C731	1-161-013-00	CERAMIC	0.01MF	10%	25V
C732	1-123-369-00	ELECT	4.7MF	20%	25V
C733	1-102-959-00	CERAMIC	22PF	5%	50V
C734	1-101-004-00	CERAMIC	0.01MF		50V
C735	1-123-318-00	ELECT	33MF	20%	16V
C736	1-123-369-00	ELECT	4.7MF	20%	25V
C737	1-123-379-00	ELECT	0.47MF	20%	50V
C738	1-123-356-00	ELECT	10MF	20%	16V
C739	1-123-381-00	ELECT	2.2MF	20%	50V
C740	1-123-356-00	ELECT	10MF	20%	16V

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
C741	1-123-356-00	ELECT 10MF 20%	16V
C742	1-101-004-00	CERAMIC 0.01MF	50V
C743	1-123-356-00	ELECT 10MF 20%	16V
C744	1-101-004-00	CERAMIC 0.01MF	50V
C745	1-123-324-00	ELECT 1000MF 20%	16V
C746	1-101-004-00	CERAMIC 0.01MF	50V
C754	1-101-004-00	CERAMIC 0.01MF	50V
C755	1-101-004-00	CERAMIC 0.01MF	50V

DISCRIMINATOR

CD701	1-404-380-00	DISCRIMINATOR, CERAMIC 5.5MHZ	

FILTER

CF001	1-527-875-00	FILTER, CERAMIC	
CF301	1-527-998-00	FILTER, CERAMIC	
CF601	1-527-849-00	FILTER, CERAMIC	
CF701	1-527-263-00	CERAMIC FILTER (5.5MHZ)	

CONNECTOR

CN001	*1-560-894-00	PIN, CONNECTOR 6P	
CN002	*1-560-894-00	PIN, CONNECTOR 6P	
CN003	*1-560-893-00	PIN, CONNECTOR 5P	
CN701	*1-560-898-00	PIN, CONNECTOR 10P	

JACK

CNJ001	1-536-936-11	CONNECTOR BOARD, BNC	
CNJ002	1-536-936-11	CONNECTOR BOARD, BNC	
CNJ003	1-562-940-11	JACK, PIN	
CNJ004	1-562-941-11	JACK, PIN	

TRIMMER

CT701	1-404-134-00	TRAP, CERAMIC (5.5MHZ)	

DIODE

D001	8-719-911-19	DIODE 1SS119	
D002	8-719-911-19	DIODE 1SS119	
D003	8-719-911-19	DIODE 1SS119	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-911-19	DIODE 1SS119	
D006	8-719-911-19	DIODE 1SS119	
D007	8-719-911-19	DIODE 1SS119	
D008	8-719-911-19	DIODE 1SS119	
D009	8-719-000-12	DIODE MC931	
D010	8-719-101-63	DIODE RD6.8EL1	
D011	8-719-100-36	DIODE RD5.6EB3	
D012	8-719-911-19	DIODE 1SS119	
D013	8-719-911-19	DIODE 1SS119	
D014	8-719-000-06	DIODE MC921	
D015	8-719-911-19	DIODE 1SS119	
D016	8-719-911-19	DIODE 1SS119	
D017	8-719-911-19	DIODE 1SS119	
D018	8-719-911-19	DIODE 1SS119	
D301	8-719-911-19	DIODE 1SS119	

Ref.No	Part No.	Description	Remark
D302	8-719-000-06	DIODE MC921	
D303	8-719-000-06	DIODE MC921	
D304	8-719-911-19	DIODE 1SS119	
D305	8-719-911-19	DIODE 1SS119	
D601	8-719-911-19	DIODE 1SS119	
D701	8-719-911-19	DIODE 1SS119	
D702	8-719-911-19	DIODE 1SS119	
D703	8-719-911-19	DIODE 1SS119	
D704	8-719-911-19	DIODE 1SS119	
D707	8-719-911-19	DIODE 1SS119	

DELAY LINE

DL003	1-415-313-00	DELAY LINE (1H)	
DL401	1-415-352-11	DELAY LINE, 1H	
DL501	1-415-282-00	DELAY LINE	

IC

IC001	8-759-101-62	IC CX20043	
IC003	8-759-203-99	IC CX10021B-NP	
IC004	8-759-202-47	IC CX10023	
IC005	8-752-004-50	IC CX20045	
IC006	8-759-200-60	IC TA7060AP	
IC007	8-759-920-80	IC BA7004	
IC301	8-759-208-94	IC CX-894	
IC302	8-752-006-10	IC CX20061	
IC303	8-759-909-20	IC BA634	
IC304	8-759-904-95	IC BA7007	
IC401	8-758-662-00	IC CX-866B	
IC701	8-759-276-07	IC TA7607AP	
IC702	8-759-193-91	IC UPC1391H	
IC703	8-759-157-40	IC UPC574J	

COIL

L002	1-408-422-00	MICRO INDUCTOR 120UH	
L003	1-408-427-00	MICRO INDUCTOR 330UH	
L004	1-408-422-00	MICRO INDUCTOR 120UH	
L005	1-408-424-00	MICRO INDUCTOR 180UH	
L006	1-408-422-00	MICRO INDUCTOR 120UH	
L007	1-408-421-00	MICRO INDUCTOR 100UH	
L008	1-408-419-00	MICRO INDUCTOR 68UH	
L009	1-408-423-00	MICRO INDUCTOR 150UH	
L010	1-408-416-00	MICRO INDUCTOR 39UH	
L011	1-408-409-00	MICRO INDUCTOR 10UH	
L012	1-408-423-00	MICRO INDUCTOR 150UH	
L015	1-408-420-00	MICRO INDUCTOR 82UH	
L016	1-407-496-00	MICRO INDUCTOR 2.2MMH	
L017	1-407-499-00	MICRO INDUCTOR 3.9MMH	
L018	1-407-495-51	MICRO INDUCTOR 1.8MMH	
L019	1-408-427-00	MICRO INDUCTOR 330UH	
L020	1-408-428-00	MICRO INDUCTOR 390UH	
L021	1-408-415-00	MICRO INDUCTOR 33UH	
L022	1-408-408-00	MICRO INDUCTOR 8.2UH	
L023	1-408-406-00	MICRO INDUCTOR 5.6UH	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L024	1-408-415-00	MICRO INDUCTOR 33UH	
L025	1-408-878-00	MICRO INDUCTOR 0.33UH	
L026	1-408-427-00	MICRO INDUCTOR 330UH	
L029	1-408-411-00	MICRO INDUCTOR 15UH	
L030	1-408-411-00	MICRO INDUCTOR 15UH	
L031	1-408-429-00	MICRO INDUCTOR 470UH	
L032	1-408-427-00	MICRO INDUCTOR 330UH	
L033	1-408-876-00	MICRO INDUCTOR 0.18UH	
L034	1-408-429-00	MICRO INDUCTOR 470UH	
L035	1-408-429-00	MICRO INDUCTOR 470UH	
L036	1-408-422-00	MICRO INDUCTOR 120UH	
L037	1-408-421-00	MICRO INDUCTOR 100UH	
L038	1-408-413-00	MICRO INDUCTOR 22UH	
L039	1-408-427-00	MICRO INDUCTOR 330UH	
L401	1-408-397-00	MICRO INDUCTOR 1UH	
L402	1-408-397-00	MICRO INDUCTOR 1UH	
L403	1-408-416-00	MICRO INDUCTOR 39UH	
L404	1-408-424-00	MICRO INDUCTOR 180UH	
L501	1-408-408-00	MICRO INDUCTOR 8.2UH	
L502	1-408-423-00	MICRO INDUCTOR 150UH	
L701	1-408-397-00	MICRO INDUCTOR 1UH	
L702	1-408-406-00	MICRO INDUCTOR 5.6UH	
L703	1-408-406-00	MICRO INDUCTOR 5.6UH	
L704	1-408-409-00	MICRO INDUCTOR 10UH	
L705	1-408-406-00	MICRO INDUCTOR 5.6UH	
L706	1-408-412-00	MICRO INDUCTOR 18UH	
L707	1-408-413-00	MICRO INDUCTOR 22UH	
L708	1-408-417-00	MICRO INDUCTOR 47UH	
		LOW PASS FILTER	
LPF001	1-235-097-00	FILTER, LOW PASS	
		VARIABLE COIL	
LV301	1-408-532-00	COIL, VARIABLE	
LV302	1-408-513-00	COIL (VARIABLE)	
LV303	1-407-291-00	MICRO INDUCTOR 15MMH	
LV501	1-408-512-00	COIL (VARIABLE)	
		IC LINK	
PS001⚠	1-532-685-11	LINK, IC	
		TRANSISTOR	
Q001	8-729-245-83	TRANSISTOR 2SC2458	
Q003	8-729-245-83	TRANSISTOR 2SC2458	
Q004	8-729-245-83	TRANSISTOR 2SC2458	
Q005	8-729-384-46	TRANSISTOR 2SA844-C	
Q006	8-729-384-46	TRANSISTOR 2SA844-C	
Q007	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q008	8-729-384-46	TRANSISTOR 2SA844-C	
Q009	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q010	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q011	8-729-603-30	TRANSISTOR 2SC403SP-3	

Ref.No	Part No.	Description	Remark
Q012	8-729-900-36	TRANSISTOR DTC124ES	
Q013	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q014	8-729-384-46	TRANSISTOR 2SA844-C	
Q015	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q016	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q017	8-729-384-46	TRANSISTOR 2SA844-C	
Q018	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q019	8-729-384-46	TRANSISTOR 2SA844-C	
Q020	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q021	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q028	8-729-245-83	TRANSISTOR 2SC2458	
Q029	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q030	8-729-900-36	TRANSISTOR DTC124ES	
Q031	8-729-245-83	TRANSISTOR 2SC2458	
Q034	8-729-900-36	TRANSISTOR DTC124ES	
Q035	8-729-245-83	TRANSISTOR 2SC2458	
Q036	8-729-245-83	TRANSISTOR 2SC2458	
Q037	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q038	8-729-384-46	TRANSISTOR 2SA844-C	
Q039	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q040	8-729-177-43	TRANSISTOR 2SD774	
Q041	8-729-177-43	TRANSISTOR 2SD774	
Q042	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q043	8-729-900-36	TRANSISTOR DTC124ES	
Q044	8-729-900-36	TRANSISTOR DTC124ES	
Q045	8-729-245-83	TRANSISTOR 2SC2458	
Q046	8-729-245-83	TRANSISTOR 2SC2458	
Q047	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q048	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q049	8-729-245-83	TRANSISTOR 2SC2458	
Q050	8-729-245-83	TRANSISTOR 2SC2458	
Q051	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q301	8-729-245-83	TRANSISTOR 2SC2458	
Q302	8-729-900-85	TRANSISTOR DTC144WS	
Q303	8-729-245-83	TRANSISTOR 2SC2458	
Q304	8-729-245-83	TRANSISTOR 2SC2458	
Q305	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q306	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q307	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q308	8-729-900-65	TRANSISTOR DTA144ES	
Q309	8-729-900-89	TRANSISTOR DTC144ES	
Q310	8-729-900-85	TRANSISTOR DTC144WS	
Q314	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q401	8-729-245-83	TRANSISTOR 2SC2458	
Q501	8-729-245-83	TRANSISTOR 2SC2458	
Q502	8-729-245-83	TRANSISTOR 2SC2458	
Q503	8-729-245-83	TRANSISTOR 2SC2458	
Q504	8-729-245-83	TRANSISTOR 2SC2458	
Q601	8-729-245-83	TRANSISTOR 2SC2458	
Q603	8-729-245-83	TRANSISTOR 2SC2458	
Q604	8-729-245-83	TRANSISTOR 2SC2458	
Q605	8-729-245-83	TRANSISTOR 2SC2458	
Q606	8-729-245-83	TRANSISTOR 2SC2458	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description				Remark
Q701	8-729-203-28	TRANSISTOR 2SC2216				
Q702	8-769-200-10	TRANSISTOR 2SK107-1				
Q703	8-729-204-83	TRANSISTOR 2SA1048-GR				
Q705	8-729-245-83	TRANSISTOR 2SC2458				
Q706	8-729-245-83	TRANSISTOR 2SC2458				
Q707	8-769-200-20	TRANSISTOR 2SK107-2				
Q708	8-729-900-63	TRANSISTOR DTA124ES				
Q709	8-729-900-63	TRANSISTOR DTA124ES				
Q710	8-729-900-63	TRANSISTOR DTA124ES				
Q711	8-729-900-89	TRANSISTOR DTC144ES				
Q712	8-729-113-32	TRANSISTOR 2SB733-2				
		RESISTOR				
R003	1-247-831-00	CARBON	1K	5%	1/6W	
R004	1-249-421-11	CARBON	2.2K	5%	1/6W	
R005	1-249-421-11	CARBON	2.2K	5%	1/6W	
R006	1-247-861-00	CARBON	18K	5%	1/6W	
R007	1-247-901-00	CARBON	820K	5%	1/6W	
R008	1-247-857-00	CARBON	12K	5%	1/6W	
R009	1-247-903-00	CARBON	1M	5%	1/6W	
R010	1-247-857-00	CARBON	12K	5%	1/6W	
R011	1-249-421-11	CARBON	2.2K	5%	1/6W	
R012	1-247-861-00	CARBON	18K	5%	1/6W	
R013	1-247-841-00	CARBON	2.7K	5%	1/6W	
R014	1-247-879-00	CARBON	100K	5%	1/6W	
R015	1-247-847-00	CARBON	4.7K	5%	1/6W	
R016	1-247-847-00	CARBON	4.7K	5%	1/6W	
R017	1-247-851-00	CARBON	6.8K	5%	1/6W	
R018	1-247-807-00	CARBON	100	5%	1/6W	
R019	1-247-831-00	CARBON	1K	5%	1/6W	
R020	1-247-830-00	CARBON	910	5%	1/6W	
R023	1-247-849-00	CARBON	5.6K	5%	1/6W	
R024	1-249-429-11	CARBON	10K	5%	1/6W	
R025	1-249-437-11	CARBON	47K	5%	1/6W	
R026	1-247-883-00	CARBON	150K	5%	1/6W	
R027	1-249-421-11	CARBON	2.2K	5%	1/6W	
R028	1-247-831-00	CARBON	1K	5%	1/6W	
R029	1-247-823-00	CARBON	470	5%	1/6W	
R030	1-247-831-00	CARBON	1K	5%	1/6W	
R031	1-249-421-11	CARBON	2.2K	5%	1/6W	
R032	1-247-823-00	CARBON	470	5%	1/6W	
R033	1-247-831-00	CARBON	1K	5%	1/6W	
R035	1-247-883-00	CARBON	150K	5%	1/6W	
R036	1-247-837-00	CARBON	1.8K	5%	1/6W	
R037	1-247-837-00	CARBON	1.8K	5%	1/6W	
R038	1-247-849-00	CARBON	5.6K	5%	1/6W	
R039	1-249-434-11	CARBON	27K	5%	1/6W	
R040	1-247-877-00	CARBON	82K	5%	1/6W	
R041	1-247-831-00	CARBON	1K	5%	1/6W	
R042	1-247-831-00	CARBON	1K	5%	1/6W	
R043	1-247-835-00	CARBON	1.5K	5%	1/6W	
R044	1-247-824-00	CARBON	510	5%	1/6W	
R045	1-247-831-00	CARBON	1K	5%	1/6W	
R046	1-247-833-00	CARBON	1.2K	5%	1/6W	
R047	1-247-824-00	CARBON	510	5%	1/6W	
R048	1-247-875-00	CARBON	68K	5%	1/6W	
R049	1-247-875-00	CARBON	68K	5%	1/6W	
R050	1-247-837-00	CARBON	1.8K	5%	1/6W	
R051	1-247-834-00	CARBON	1.3K	5%	1/6W	
R052	1-247-811-00	CARBON	150	5%	1/6W	
R053	1-247-890-00	CARBON	300K	5%	1/6W	
R054	1-247-829-00	CARBON	820	5%	1/6W	
R055	1-249-421-11	CARBON	2.2K	5%	1/6W	
R056	1-247-821-00	CARBON	390	5%	1/6W	
R057	1-249-421-11	CARBON	2.2K	5%	1/6W	
R058	1-247-863-00	CARBON	22K	5%	1/6W	
R059	1-247-863-00	CARBON	22K	5%	1/6W	
R060	1-247-819-00	CARBON	330	5%	1/6W	
R061	1-247-812-00	CARBON	160	5%	1/6W	
R062	1-249-429-11	CARBON	10K	5%	1/6W	
R063	1-247-831-00	CARBON	1K	5%	1/6W	
R064	1-247-811-00	CARBON	150	5%	1/6W	
R065	1-247-815-00	CARBON	220	5%	1/6W	
R066	1-247-831-00	CARBON	1K	5%	1/6W	
R067	1-247-834-00	CARBON	1.3K	5%	1/6W	
R068	1-247-821-00	CARBON	390	5%	1/6W	
R069	1-247-834-00	CARBON	1.3K	5%	1/6W	
R070	1-249-429-11	CARBON	10K	5%	1/6W	
R071	1-249-429-11	CARBON	10K	5%	1/6W	
R072	1-247-831-00	CARBON	1K	5%	1/6W	
R073	1-247-833-00	CARBON	1.2K	5%	1/6W	
R074	1-247-807-00	CARBON	100	5%	1/6W	
R075	1-247-875-00	CARBON	68K	5%	1/6W	
R076	1-247-853-00	CARBON	8.2K	5%	1/6W	
R077	1-249-429-11	CARBON	10K	5%	1/6W	
R078	1-247-837-00	CARBON	1.8K	5%	1/6W	
R079	1-247-832-00	CARBON	1.1K	5%	1/6W	
R080	1-249-421-11	CARBON	2.2K	5%	1/6W	
R081	1-247-810-00	CARBON	130	5%	1/6W	
R082	1-247-817-00	CARBON	270	5%	1/6W	
R083	1-247-821-00	CARBON	390	5%	1/6W	
R084	1-247-863-00	CARBON	22K	5%	1/6W	
R085	1-247-863-00	CARBON	22K	5%	1/6W	
R086	1-247-829-00	CARBON	820	5%	1/6W	
R087	1-247-819-00	CARBON	330	5%	1/6W	
R088	1-247-812-00	CARBON	160	5%	1/6W	
R089	1-249-429-11	CARBON	10K	5%	1/6W	
R090	1-247-831-00	CARBON	1K	5%	1/6W	
R091	1-247-832-00	CARBON	1.1K	5%	1/6W	
R092	1-247-831-00	CARBON	1K	5%	1/6W	
R093	1-247-824-00	CARBON	510	5%	1/6W	
R094	1-247-847-00	CARBON	4.7K	5%	1/6W	
R095	1-247-842-00	CARBON	3K	5%	1/6W	
R096	1-247-831-00	CARBON	1K	5%	1/6W	
R097	1-215-450-00	METAL	16K	1%	1/6W	
R098	1-215-461-00	METAL	47K	1%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R099	1-247-867-00	CARBON	33K	5%	1/6W	
R118	1-247-831-00	CARBON	1K	5%	1/6W	
R119	1-247-831-00	CARBON	1K	5%	1/6W	
R120	1-247-859-00	CARBON	15K	5%	1/6W	
R121	1-247-847-00	CARBON	4.7K	5%	1/6W	
R122	1-247-819-00	CARBON	330	5%	1/6W	
R124	1-247-831-00	CARBON	1K	5%	1/6W	
R125	1-247-891-00	CARBON	330K	5%	1/6W	
R126	1-247-887-00	CARBON	220K	5%	1/6W	
R127	1-249-437-11	CARBON	47K	5%	1/6W	
R128	1-247-878-00	CARBON	91K	5%	1/6W	
R129	1-249-421-11	CARBON	2.2K	5%	1/6W	
R130	1-247-889-00	CARBON	270K	5%	1/6W	
R131	1-247-867-00	CARBON	33K	5%	1/6W	
R132	1-247-843-00	CARBON	3.3K	5%	1/6W	
R133	1-247-854-00	CARBON	9.1K	5%	1/6W	
R134	1-247-848-00	CARBON	5.1K	5%	1/6W	
R135	1-247-846-00	CARBON	4.3K	5%	1/6W	
R136	1-247-843-00	CARBON	3.3K	5%	1/6W	
R137	1-247-892-00	CARBON	360K	5%	1/6W	
R138	1-247-894-00	CARBON	430K	5%	1/6W	
R139	1-247-879-00	CARBON	100K	5%	1/6W	
R140	1-247-828-00	CARBON	750	5%	1/6W	
R141	1-249-421-11	CARBON	2.2K	5%	1/6W	
R142	1-247-841-00	CARBON	2.7K	5%	1/6W	
R143	1-247-846-00	CARBON	4.3K	5%	1/6W	
R144	1-249-419-11	CARBON	1.5K	5%	1/6W	
R145	1-249-419-11	CARBON	1.5K	5%	1/6W	
R149	1-249-421-11	CARBON	2.2K	5%	1/6W	
R150	1-247-843-00	CARBON	3.3K	5%	1/6W	
R151	1-247-841-00	CARBON	2.7K	5%	1/6W	
R152	1-247-843-00	CARBON	3.3K	5%	1/6W	
R153	1-247-877-00	CARBON	82K	5%	1/6W	
R154	1-247-819-00	CARBON	330	5%	1/6W	
R155	1-247-845-00	CARBON	3.9K	5%	1/6W	
R156	1-247-845-00	CARBON	3.9K	5%	1/6W	
R157	1-249-421-11	CARBON	2.2K	5%	1/6W	
R158	1-247-831-00	CARBON	1K	5%	1/6W	
R159	1-249-437-11	CARBON	47K	5%	1/6W	
R160	1-247-824-00	CARBON	510	5%	1/6W	
R162	1-247-825-00	CARBON	560	5%	1/6W	
R163	1-247-825-00	CARBON	560	5%	1/6W	
R165	1-247-851-00	CARBON	6.8K	5%	1/6W	
R166	1-247-851-00	CARBON	6.8K	5%	1/6W	
R167	1-247-815-00	CARBON	220	5%	1/6W	
R168	1-247-825-00	CARBON	560	5%	1/6W	
R169	1-247-825-00	CARBON	560	5%	1/6W	
R170	1-247-859-00	CARBON	15K	5%	1/6W	
R171	1-249-429-11	CARBON	10K	5%	1/6W	
R172	1-247-862-00	CARBON	20K	5%	1/6W	
R173	1-249-429-11	CARBON	10K	5%	1/6W	
R174	1-247-819-00	CARBON	330	5%	1/6W	
R175	1-247-821-00	CARBON	390	5%	1/6W	
R176	1-247-838-00	CARBON	2K	5%	1/6W	
R177	1-247-853-00	CARBON	8.2K	5%	1/6W	
R178	1-247-870-00	CARBON	43K	5%	1/6W	
R179	1-247-889-00	CARBON	270K	5%	1/6W	
R180 ⚠	1-217-387-00	FUSIBLE	10	5%	1/4W	F
R181	1-247-840-00	CARBON	2.4K	5%	1/6W	
R182	1-247-837-00	CARBON	1.8K	5%	1/6W	
R183	1-247-831-00	CARBON	1K	5%	1/6W	
R184	1-247-829-00	CARBON	820	5%	1/6W	
R185	1-247-829-00	CARBON	820	5%	1/6W	
R186	1-247-831-00	CARBON	1K	5%	1/6W	
R187	1-247-831-00	CARBON	1K	5%	1/6W	
R188	1-247-831-00	CARBON	1K	5%	1/6W	
R190	1-247-817-00	CARBON	270	5%	1/6W	
R191	1-249-419-11	CARBON	1.5K	5%	1/6W	
R192	1-247-837-00	CARBON	1.8K	5%	1/6W	
R193	1-247-837-00	CARBON	1.8K	5%	1/6W	
R194	1-249-419-11	CARBON	1.5K	5%	1/6W	
R195	1-249-419-11	CARBON	1.5K	5%	1/6W	
R196	1-247-831-00	CARBON	1K	5%	1/6W	
R198	1-247-817-00	CARBON	270	5%	1/6W	
R199	1-247-857-00	CARBON	12K	5%	1/6W	
R200	1-247-832-00	CARBON	1.1K	5%	1/6W	
R201	1-247-831-00	CARBON	1K	5%	1/6W	
R203	1-247-841-00	CARBON	2.7K	5%	1/6W	
R204	1-247-867-00	CARBON	33K	5%	1/6W	
R205	1-247-879-00	CARBON	100K	5%	1/6W	
R206	1-247-867-00	CARBON	33K	5%	1/6W	
R207	1-247-863-00	CARBON	22K	5%	1/6W	
R208	1-249-429-11	CARBON	10K	5%	1/6W	
R209	1-249-429-11	CARBON	10K	5%	1/6W	
R210	1-247-847-00	CARBON	4.7K	5%	1/6W	
R211	1-247-879-00	CARBON	100K	5%	1/6W	
R212	1-247-879-00	CARBON	100K	5%	1/6W	
R213	1-247-851-00	CARBON	6.8K	5%	1/6W	
R214	1-247-879-00	CARBON	100K	5%	1/6W	
R215	1-249-437-11	CARBON	47K	5%	1/6W	
R216	1-249-437-11	CARBON	47K	5%	1/6W	
R217	1-247-818-00	CARBON	300	5%	1/6W	
R218	1-247-811-00	CARBON	150	5%	1/6W	
R219	1-247-813-00	CARBON	180	5%	1/6W	
R220	1-247-838-00	CARBON	2K	5%	1/6W	
R221	1-247-831-00	CARBON	1K	5%	1/6W	
R222	1-247-803-00	CARBON	68	5%	1/6W	
R223	1-247-804-00	CARBON	75	5%	1/6W	
R225	1-247-867-00	CARBON	33K	5%	1/6W	
R226	1-247-853-00	CARBON	8.2K	5%	1/6W	
R227	1-247-831-00	CARBON	1K	5%	1/6W	
R228	1-247-867-00	CARBON	33K	5%	1/6W	
R231	1-247-843-00	CARBON	3.3K	5%	1/6W	
R250	1-247-827-00	CARBON	680	5%	1/6W	
R301	1-247-867-00	CARBON	33K	5%	1/6W	
R302	1-247-863-00	CARBON	22K	5%	1/6W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description				Remark
R303	1-247-825-00	CARBON	560	5%	1/6W	
R304	1-247-825-00	CARBON	560	5%	1/6W	
R305	1-247-807-00	CARBON	100	5%	1/6W	
R306	1-247-800-00	CARBON	51	5%	1/6W	
R307	1-247-825-00	CARBON	560	5%	1/6W	
R308	1-247-831-00	CARBON	1K	5%	1/6W	
R309	1-247-853-00	CARBON	8.2K	5%	1/6W	
R310	1-249-429-11	CARBON	10K	5%	1/6W	
R311	1-247-807-00	CARBON	100	5%	1/6W	
R312	1-247-879-00	CARBON	100K	5%	1/6W	
R313	1-247-881-00	CARBON	120K	5%	1/6W	
R314	1-247-785-00	CARBON	12	5%	1/6W	
R315	1-247-806-00	CARBON	91	5%	1/6W	
R316	1-247-824-00	CARBON	510	5%	1/6W	
R317	1-247-807-00	CARBON	100	5%	1/6W	
R318	1-247-819-00	CARBON	330	5%	1/6W	
R319	1-247-867-00	CARBON	33K	5%	1/6W	
R320	1-247-849-00	CARBON	5.6K	5%	1/6W	
R321	1-249-429-11	CARBON	10K	5%	1/6W	
R322	1-247-867-00	CARBON	33K	5%	1/6W	
R323	1-247-847-00	CARBON	4.7K	5%	1/6W	
R324	1-249-429-11	CARBON	10K	5%	1/6W	
R325	1-247-847-00	CARBON	4.7K	5%	1/6W	
R326	1-247-831-00	CARBON	1K	5%	1/6W	
R327	1-247-815-00	CARBON	220	5%	1/6W	
R328	1-247-817-00	CARBON	270	5%	1/6W	
R329	1-247-863-00	CARBON	22K	5%	1/6W	
R330	1-249-437-11	CARBON	47K	5%	1/6W	
R331	1-247-891-00	CARBON	330K	5%	1/6W	
R332	1-247-847-00	CARBON	4.7K	5%	1/6W	
R333	1-249-429-11	CARBON	10K	5%	1/6W	
R334	1-249-419-11	CARBON	1.5K	5%	1/6W	
R337	1-247-873-00	CARBON	56K	5%	1/6W	
R338	1-247-867-00	CARBON	33K	5%	1/6W	
R401	1-247-810-00	CARBON	130	5%	1/6W	
R402	1-247-806-00	CARBON	91	5%	1/6W	
R403	1-247-867-00	CARBON	33K	5%	1/6W	
R404	1-247-873-00	CARBON	56K	5%	1/6W	
R405	1-247-831-00	CARBON	1K	5%	1/6W	
R406	1-247-832-00	CARBON	1.1K	5%	1/6W	
R407	1-247-832-00	CARBON	1.1K	5%	1/6W	
R408	1-247-849-00	CARBON	5.6K	5%	1/6W	
R409	1-247-831-00	CARBON	1K	5%	1/6W	
R410	1-247-831-00	CARBON	1K	5%	1/6W	
R411	1-247-847-00	CARBON	4.7K	5%	1/6W	
R412	1-247-828-00	CARBON	750	5%	1/6W	
R413	1-247-812-00	CARBON	160	5%	1/6W	
R414	1-247-847-00	CARBON	4.7K	5%	1/6W	
R415	1-247-831-00	CARBON	1K	5%	1/6W	
R416	1-247-846-00	CARBON	4.3K	5%	1/6W	
R417	1-247-797-00	CARBON	39	5%	1/6W	
R501	1-247-867-00	CARBON	33K	5%	1/6W	
R502	1-247-847-00	CARBON	4.7K	5%	1/6W	
R503	1-247-863-00	CARBON	22K	5%	1/6W	
R504	1-247-821-00	CARBON	390	5%	1/6W	
R505	1-249-421-11	CARBON	2.2K	5%	1/6W	
R506	1-247-821-00	CARBON	390	5%	1/6W	
R507	1-247-821-00	CARBON	390	5%	1/6W	
R508	1-247-821-00	CARBON	390	5%	1/6W	
R509	1-247-821-00	CARBON	390	5%	1/6W	
R510	1-249-421-11	CARBON	2.2K	5%	1/6W	
R511	1-247-821-00	CARBON	390	5%	1/6W	
R512	1-249-421-11	CARBON	2.2K	5%	1/6W	
R513	1-247-831-00	CARBON	1K	5%	1/6W	
R601	1-247-807-00	CARBON	100	5%	1/6W	
R602	1-247-843-00	CARBON	3.3K	5%	1/6W	
R603	1-247-899-00	CARBON	680K	5%	1/6W	
R604	1-247-829-00	CARBON	820	5%	1/6W	
R605	1-247-823-00	CARBON	470	5%	1/6W	
R606	1-247-819-00	CARBON	330	5%	1/6W	
R607	1-247-847-00	CARBON	4.7K	5%	1/6W	
R608	1-247-881-00	CARBON	120K	5%	1/6W	
R609	1-247-875-00	CARBON	68K	5%	1/6W	
R610	1-247-831-00	CARBON	1K	5%	1/6W	
R611	1-247-831-00	CARBON	1K	5%	1/6W	
R612	1-247-867-00	CARBON	33K	5%	1/6W	
R613	1-247-863-00	CARBON	22K	5%	1/6W	
R617	1-247-825-00	CARBON	560	5%	1/6W	
R618	1-247-831-00	CARBON	1K	5%	1/6W	
R619	1-247-851-00	CARBON	6.8K	5%	1/6W	
R620	1-247-879-00	CARBON	100K	5%	1/6W	
R621	1-249-429-11	CARBON	10K	5%	1/6W	
R622	1-249-429-11	CARBON	10K	5%	1/6W	
R623	1-247-807-00	CARBON	100	5%	1/6W	
R624	1-249-421-11	CARBON	2.2K	5%	1/6W	
R625	1-247-831-00	CARBON	1K	5%	1/6W	
R626	1-249-421-11	CARBON	2.2K	5%	1/6W	
R627	1-247-807-00	CARBON	100	5%	1/6W	
R628	1-247-843-00	CARBON	3.3K	5%	1/6W	
R629	1-247-819-00	CARBON	330	5%	1/6W	
R630	1-247-851-00	CARBON	6.8K	5%	1/6W	
R701	1-247-801-00	CARBON	56	5%	1/6W	
R702	1-247-847-00	CARBON	4.7K	5%	1/6W	
R703	1-249-421-11	CARBON	2.2K	5%	1/6W	
R704	1-247-815-00	CARBON	220	5%	1/6W	
R705	1-247-819-00	CARBON	330	5%	1/6W	
R706	1-247-813-00	CARBON	180	5%	1/6W	
R707	1-247-837-00	CARBON	1.8K	5%	1/6W	
R708	1-249-419-11	CARBON	1.5K	5%	1/6W	
R709	1-247-841-00	CARBON	2.7K	5%	1/6W	
R710	1-247-895-00	CARBON	470K	5%	1/6W	
R711	1-247-863-00	CARBON	22K	5%	1/6W	
R712	1-247-901-00	CARBON	820K	5%	1/6W	
R713	1-247-831-00	CARBON	1K	5%	1/6W	
R714	1-247-813-00	CARBON	180	5%	1/6W	
R715	1-247-807-00	CARBON	100	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R716	1-246-463-00	CARBON	390	5%	1/4W	
R717	1-247-797-00	CARBON	39	5%	1/6W	
R720	1-247-805-00	CARBON	82	5%	1/6W	
R721	1-247-831-00	CARBON	1K	5%	1/6W	
R723	1-247-831-00	CARBON	1K	5%	1/6W	
R724	1-247-847-00	CARBON	4.7K	5%	1/6W	
R725	1-247-869-00	CARBON	39K	5%	1/6W	
R727	1-247-817-00	CARBON	270	5%	1/6W	
R728	1-247-821-00	CARBON	390	5%	1/6W	
R729	1-247-849-00	CARBON	5.6K	5%	1/6W	
R730	1-247-853-00	CARBON	8.2K	5%	1/6W	
R731	1-247-873-00	CARBON	56K	5%	1/6W	
R732	1-247-867-00	CARBON	33K	5%	1/6W	
R733	1-247-831-00	CARBON	1K	5%	1/6W	
R734	1-249-429-11	CARBON	10K	5%	1/6W	
R735	1-247-901-00	CARBON	820K	5%	1/6W	
R736	1-247-889-00	CARBON	270K	5%	1/6W	
R737	1-247-895-00	CARBON	470K	5%	1/6W	
R738	1-247-867-00	CARBON	33K	5%	1/6W	
R740	1-247-857-00	CARBON	12K	5%	1/6W	
R741	1-247-857-00	CARBON	12K	5%	1/6W	
R742	1-247-242-00	CARBON	1.2K	5%	1/2W	
R743	1-247-863-00	CARBON	22K	5%	1/6W	
R744	1-247-831-00	CARBON	1K	5%	1/6W	
R750	1-247-845-00	CARBON	3.9K	5%	1/6W	
R751	1-247-903-00	CARBON	1M	5%	1/6W	
R752	1-247-879-00	CARBON	100K	5%	1/6W	
R753	1-249-429-11	CARBON	10K	5%	1/6W	

VARIABLE RESISTOR

Ref.No	Part No.	Description	Remark
RV002	1-228-995-00	RES, ADJ, CARBON 22K	
RV003	1-228-990-00	RES, ADJ, CARBON 1K	
RV004	1-228-996-00	RES, ADJ, CARBON 47K	
RV005	1-228-990-00	RES, ADJ, CARBON 1K	
RV006	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV007	1-228-990-00	RES, ADJ, CARBON 1K	
RV008	1-228-989-00	RES, ADJ, CARBON 470	
RV009	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV010	1-228-996-00	RES, ADJ, CARBON 47K	
RV012	1-228-996-00	RES, ADJ, CARBON 47K	
RV013	1-228-994-00	RES, ADJ, CARBON 10K	
RV014	1-228-995-00	RES, ADJ, CARBON 22K	
RV015	1-228-991-00	RES, ADJ, CARBON 2.2K	
RV016	1-228-996-00	RES, ADJ, CARBON 47K	
RV017	1-228-991-00	RES, ADJ, CARBON 2.2K	
RV018	1-228-994-00	RES, ADJ, CARBON 10K	
RV019	1-228-996-00	RES, ADJ, CARBON 47K	
RV020	1-228-991-00	RES, ADJ, CARBON 2.2K	
RV021	1-228-991-00	RES, ADJ, CARBON 2.2K	
RV022	1-228-991-00	RES, ADJ, CARBON 2.2K	
RV301	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV401	1-228-994-00	RES, ADJ, METAL GLAZE 10K	
RV501	1-228-989-00	RES, ADJ, CARBON 470	
RV601	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV701	1-228-991-00	RES, ADJ, CARBON 2.2K	

FILTER

Ref.No	Part No.	Description	Remark
SF701	1-404-433-00	SAWF	

SWITCH

Ref.No	Part No.	Description	Remark
SW001	1-553-725-21	SWITCH, SLIDE	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T001	1-426-093-00	COIL, REC C BPT	
T701	1-404-428-00	VIFT	
T702	1-404-427-00	VIFT	
T703	1-404-427-00	VIFT	

TUNER

Ref.No	Part No.	Description	Remark
TU701⚠	1-463-584-11	TUNER, ET (BT-881A)	

CRYSTAL

Ref.No	Part No.	Description	Remark
X001	1-527-345-00	CRYSTAL, OSC	
X002	1-567-491-11	OSCILLATOR, CERAMIC	

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*A-6715-291-A SA-13 BOARD, COMPLETE
****

Part No.	Description
7-685-646-71	SCREW +BVTP 3X8 TYPE2 1T-3
7-685-646-81	SCREW +BVTP 3X8 TYPE2

CAPACITOR

Ref.No	Part No.	Description				Remark
C001	1-123-381-00	ELECT	2.2MF	20%	50V	
C002	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C003	1-123-330-00	ELECT	22MF	20%	16V	
C004	1-161-055-00	CERAMIC	0.022MF	10%	25V	
C005	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C006	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C007	1-129-794-00	FILM	0.0033MF	5%	100V	
C008	1-129-794-00	FILM	0.0033MF	5%	100V	
C009	1-161-025-00	CERAMIC	0.1MF	10%	25V	
C010	1-123-318-00	ELECT	33MF	20%	10V	
C011	1-102-963-00	CERAMIC	33PF	5%	50V	
C012	1-102-963-00	CERAMIC	33PF	5%	50V	
C017	1-101-005-00	CERAMIC	0.022MF		50V	
C304	1-101-005-00	CERAMIC	0.022MF		50V	
C305	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C306	1-130-020-00	FILM	0.0015MF	5%	50V	
C307	1-123-308-00	ELECT	220MF	20%	10V	
C308	1-123-330-00	ELECT	22MF	20%	16V	
C309	1-101-001-00	CERAMIC	0.001MF		50V	
C310	1-123-332-00	ELECT	47MF	20%	16V	
C311	1-130-479-00	MYLAR	0.0047MF	5%	50V	
C312	1-123-332-00	ELECT	47MF	20%	16V	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description				Remark
C313	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C314	1-124-445-00	ELECT	100MF	20%	16V	
C315	1-124-445-00	ELECT	100MF	20%	16V	
C316	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C317	1-123-381-00	ELECT	2.2MF	20%	50V	
C318	1-123-381-00	ELECT	2.2MF	20%	50V	
C319	1-123-381-00	ELECT	2.2MF	20%	50V	
C320	1-123-356-00	ELECT	10MF	20%	16V	
C321	1-101-001-00	CERAMIC	0.001MF		50V	
C322	1-102-122-00	CERAMIC	0.0027MF	10%	50V	
C323	1-123-356-00	ELECT	10MF	20%	16V	
C324	1-130-491-00	MYLAR	0.047MF	5%	50V	
C325	1-130-491-00	MYLAR	0.047MF	5%	50V	
C326	1-130-491-00	MYLAR	0.047MF	5%	50V	
C327	1-130-491-00	MYLAR	0.047MF	5%	50V	
C328	1-130-491-00	MYLAR	0.047MF	5%	50V	
C329	1-130-489-00	MYLAR	0.033MF	5%	50V	
C330	1-130-489-00	MYLAR	0.033MF	5%	50V	
C331	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C332	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C333	1-136-141-00	FILM	0.001MF	5%	50V	
C334	1-130-467-00	MYLAR	470PF	5%	50V	
C335	1-130-467-00	MYLAR	470PF	5%	50V	
C336	1-130-467-00	MYLAR	470PF	5%	50V	
C337	1-123-608-00	ELECT	0.22MF	20%	50V	
C338	1-130-495-00	MYLAR	0.1MF	5%	50V	
C339	1-101-006-00	CERAMIC	0.047MF		50V	
C340	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C341	1-124-445-00	ELECT	100MF	20%	16V	
C342	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C343	1-123-343-00	ELECT	33MF	20%	25V	
C345	1-123-343-00	ELECT	33MF	20%	25V	
C346	1-101-006-00	CERAMIC	0.047MF		50V	
C347	1-127-477-00	ELECT(SOLID)	0.47MF	5%	25V	
C348	1-130-489-00	MYLAR	0.033MF	5%	50V	
C349	1-130-483-00	MYLAR	0.01MF	5%	50V	
C350	1-123-369-00	ELECT	4.7MF	20%	25V	
C351	1-123-369-00	ELECT	4.7MF	20%	25V	
C352	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C353	1-124-443-00	ELECT	100MF	20%	10V	
C354	1-130-483-00	MYLAR	0.01MF	5%	50V	
C355	1-130-483-00	MYLAR	0.01MF	5%	50V	
C356	1-130-483-00	MYLAR	0.01MF	5%	50V	
C357	1-123-369-00	ELECT	4.7MF	20%	25V	
C358	1-123-369-00	ELECT	4.7MF	20%	25V	
C359	1-123-330-00	ELECT	22MF	20%	16V	
C361	1-123-380-00	ELECT	1MF	20%	50V	
C362	1-123-380-00	ELECT	1MF	20%	50V	
C363	1-123-356-00	ELECT	10MF	20%	16V	
C364	1-123-356-00	ELECT	10MF	20%	16V	
C367	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C368	1-161-057-00	CERAMIC	0.033MF	10%	25V	
C369	1-123-356-00	ELECT	10MF	20%	16V	

Ref.No	Part No.	Description				Remark
C370	1-161-043-00	CERAMIC	0.0022MF	10%	25V	
C701	1-123-380-00	ELECT	1MF	20%	50V	
C702	1-130-485-00	MYLAR	0.015MF	5%	50V	
C703	1-123-356-00	ELECT	10MF	20%	16V	
C704	1-161-043-00	CERAMIC	0.0022MF	10%	25V	
C705	1-123-380-00	ELECT	1MF	20%	50V	
C706	1-123-318-00	ELECT	33MF	20%	16V	
C707	1-123-380-00	ELECT	1MF	20%	50V	
C709	1-130-485-00	MYLAR	0.015MF	5%	50V	
C710	1-123-369-00	ELECT	4.7MF	20%	25V	
C711	1-123-607-00	ELECT	0.1MF	20%	50V	
C712	1-123-380-00	ELECT	1MF	20%	50V	
C714	1-102-111-00	CERAMIC	270PF	10%	50V	
C716	1-123-356-00	ELECT	10MF	20%	16V	
C717	1-123-306-00	ELECT	47MF	20%	6.3V	
C718	1-123-356-00	ELECT	10MF	20%	16V	
C719	1-123-380-00	ELECT	1MF	20%	50V	
C720	1-123-369-00	ELECT	4.7MF	20%	25V	
C722	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C723	1-161-055-00	CERAMIC	0.022MF	10%	25V	
C724	1-107-171-00	MICA	120PF	10%	500V	
C725	1-136-215-00	FILM	0.0068MF	10%	400V	
C726	1-123-356-00	ELECT	10MF	20%	16V	
C727	1-124-445-00	ELECT	100MF	20%	16V	

CONNECTOR

CN001	*1-560-897-00	PIN, CONNECTOR 9P
CN002	*1-560-891-00	PIN, CONNECTOR 3P
CN003	*1-560-891-00	PIN, CONNECTOR 3P
CN004	*1-560-891-00	PIN, CONNECTOR 3P
CN005	*1-560-891-00	PIN, CONNECTOR 3P
CN006	*1-560-891-00	PIN, CONNECTOR 3P
CN007	*1-560-891-00	PIN, CONNECTOR 3P
CN008	*1-560-891-00	PIN, CONNECTOR 3P
CN009	*1-560-891-00	PIN, CONNECTOR 3P
CN010	*1-560-891-00	PIN, CONNECTOR 3P
CN011	*1-560-898-00	PIN, CONNECTOR 10P
CN012	*1-560-900-00	PIN, CONNECTOR 12P
CN301	*1-560-896-00	PIN, CONNECTOR 8P
CN302	*1-560-891-00	PIN, CONNECTOR 3P
CN303	*1-560-891-00	PIN, CONNECTOR 3P
CN304	*1-560-893-00	PIN, CONNECTOR 5P
CN305	*1-560-466-00	PIN, CONNECTOR 3P
CN306	*1-560-897-00	PIN, CONNECTOR 9P
CN701	*1-560-893-00	PIN, CONNECTOR 5P
CN702	*1-560-891-00	PIN, CONNECTOR 3P

DIODE

D001	8-719-000-06	DIODE MC921
D002	8-719-000-06	DIODE MC921
D003	8-719-000-04	DIODE MC911
D004	8-719-911-19	DIODE 1SS119
D008	8-719-000-06	DIODE MC921

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
D301	8-719-101-50	DIODE RD5.1EL2	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-000-04	DIODE MC911	
D304	8-719-000-06	DIODE MC921	
D305	8-719-911-19	DIODE 1SS119	
D306	8-719-200-02	DIODE 10E-1	
D307	8-719-100-41	DIODE RD6.8EB2	
D308	8-719-911-19	DIODE 1SS119	
D309	8-719-911-19	DIODE 1SS119	
D310	8-719-911-19	DIODE 1SS119	
D702	8-719-101-50	DIODE RD5.1EL2	

IC

Ref.No	Part No.	Description	Remark
IC001	8-759-600-24	IC M54543L	
IC002	8-759-800-72	IC LA7205	
IC003	8-759-920-26	IC MB88421-192M	
IC301	8-759-135-80	IC UPC358C	
IC302	8-759-618-48	IC M51848L	
IC303	8-759-135-80	IC UPC358C	
IC304	8-752-012-40	IC CX20124	
IC305	8-759-240-66	IC TC4066BP	
IC306	8-759-135-80	IC UPC358C	
IC701	8-759-911-23	IC BA5115	
IC702	8-759-101-73	IC UPC1513HA	

COIL

Ref.No	Part No.	Description	Remark
L001	1-408-418-00	MICRO INDUCTOR 56UH	
L301	1-410-119-11	MICRO INDUCTOR 1MMH	
L701	1-407-963-00	MICRO INDUCTOR 15MMH	
L702	1-408-221-00	MICRO INDUCTOR 22MMH	
L703	1-407-174-XX	MICRO INDUCTOR 270UH	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q001	8-729-900-89	TRANSISTOR DTC144ES	
Q002	8-729-900-89	TRANSISTOR DTC144ES	
Q003	8-729-900-89	TRANSISTOR DTC144ES	
Q004	8-729-900-89	TRANSISTOR DTC144ES	
Q005	8-729-116-42	TRANSISTOR 2SD1164-L	
Q006	8-729-177-43	TRANSISTOR 2SD774	
Q007	8-729-900-89	TRANSISTOR DTC144ES	
Q008	8-729-900-89	TRANSISTOR DTC144ES	
Q009	8-729-116-42	TRANSISTOR 2SD1164-L	
Q010	8-729-177-43	TRANSISTOR 2SD774	
Q011	8-729-177-43	TRANSISTOR 2SD774	
Q012	8-729-900-65	TRANSISTOR DTA144ES	
Q013	8-729-900-65	TRANSISTOR DTA144ES	
Q025	8-729-900-89	TRANSISTOR DTC144ES	
Q026	8-729-900-89	TRANSISTOR DTC144ES	
Q028	8-729-245-83	TRANSISTOR 2SC2458	
Q301	8-729-177-43	TRANSISTOR 2SD774	
Q302	8-729-245-83	TRANSISTOR 2SC2458	
Q303	8-729-900-89	TRANSISTOR DTC144ES	
Q304	8-729-245-83	TRANSISTOR 2SC2458	
Q305	8-729-900-65	TRANSISTOR DTA144ES	
Q306	8-729-245-83	TRANSISTOR 2SC2458	
Q307	8-729-900-89	TRANSISTOR DTC144ES	
Q308	8-729-245-83	TRANSISTOR 2SC2458	
Q309	8-729-900-65	TRANSISTOR DTA144ES	
Q310	8-729-245-83	TRANSISTOR 2SC2458	
Q311	8-729-245-83	TRANSISTOR 2SC2458	
Q312	8-729-245-83	TRANSISTOR 2SC2458	
Q313	8-729-831-33	TRANSISTOR 2SD313HP	
Q314	8-729-245-83	TRANSISTOR 2SC2458	
Q315	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q316	8-729-245-83	TRANSISTOR 2SC2458	
Q317	8-729-900-89	TRANSISTOR DTC144ES	
Q318	8-729-245-83	TRANSISTOR 2SC2458	
Q319	8-729-247-33	TRANSISTOR 2SA473	
Q320	8-729-245-83	TRANSISTOR 2SC2458	
Q321	8-729-245-83	TRANSISTOR 2SC2458	
Q322	8-729-831-33	TRANSISTOR 2SD313HP	
Q323	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q324	8-729-900-89	TRANSISTOR DTC144ES	
Q325	8-729-245-83	TRANSISTOR 2SC2458	
Q326	8-729-245-83	TRANSISTOR 2SC2458	
Q327	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q328	8-729-245-83	TRANSISTOR 2SC2458	
Q329	8-729-245-83	TRANSISTOR 2SC2458	
Q330	8-729-900-89	TRANSISTOR DTC144ES	
Q331	8-729-831-33	TRANSISTOR 2SD313HP	
Q702	8-729-612-77	TRANSISTOR 2SA1027R	
Q703	8-729-967-32	TRANSISTOR 2SC2673-R	
Q704	8-729-245-83	TRANSISTOR 2SC2458	
Q705	8-729-900-89	TRANSISTOR DTC144ES	

RESISTOR

Ref.No	Part No.	Description				Remark
R001	1-249-429-11	CARBON	10K	5%	1/6W	
R002	1-247-855-00	CARBON	10K	5%	1/6W	
R003	1-249-429-11	CARBON	10K	5%	1/6W	
R004	1-249-429-11	CARBON	10K	5%	1/6W	
R005	1-249-429-11	CARBON	10K	5%	1/6W	
R006	1-249-429-11	CARBON	10K	5%	1/6W	
R007	1-247-873-00	CARBON	56K	5%	1/6W	
R008	1-247-861-00	CARBON	18K	5%	1/6W	
R009	1-247-861-00	CARBON	18K	5%	1/6W	
R012	1-247-833-00	CARBON	1.2K	5%	1/6W	
R014	1-247-863-00	CARBON	22K	5%	1/6W	
R015	1-247-831-00	CARBON	1K	5%	1/6W	
R017	1-247-831-00	CARBON	1K	5%	1/6W	
R018	1-247-831-00	CARBON	1K	5%	1/6W	
R019	1-247-831-00	CARBON	1K	5%	1/6W	
R020	1-247-831-00	CARBON	1K	5%	1/6W	
R021	1-247-827-00	CARBON	680	5%	1/6W	
R023	1-247-831-00	CARBON	1K	5%	1/6W	
R024	1-247-831-00	CARBON	1K	5%	1/6W	
R025	1-247-831-00	CARBON	1K	5%	1/6W	

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description				Remark
R026	1-247-831-00	CARBON	1K	5%	1/6W	
R027	1-247-831-00	CARBON	1K	5%	1/6W	
R028	1-247-831-00	CARBON	1K	5%	1/6W	
R048	1-247-841-00	CARBON	2.7K	5%	1/6W	
R050	1-247-841-00	CARBON	2.7K	5%	1/6W	
R051	1-247-817-00	CARBON	270	5%	1/6W	
R052	1-247-813-00	CARBON	180	5%	1/6W	
R053	1-247-847-00	CARBON	4.7K	5%	1/6W	
R301 ⚠	1-212-849-51	FUSIBLE	4.7	5%	1/4W	F
R302	1-247-831-00	CARBON	1K	5%	1/6W	
R303	1-247-903-00	CARBON	1M	5%	1/6W	
R304	1-249-437-11	CARBON	47K	5%	1/6W	
R305	1-247-895-00	CARBON	470K	5%	1/6W	
R306	1-247-889-00	CARBON	270K	5%	1/6W	
R307 ⚠	1-212-849-51	FUSIBLE	4.7	5%	1/4W	F
R308	1-247-825-00	CARBON	560	5%	1/6W	
R309	1-247-847-00	CARBON	4.7K	5%	1/6W	
R310	1-247-847-00	CARBON	4.7K	5%	1/6W	
R311	1-247-815-00	CARBON	220	5%	1/6W	
R312	1-247-849-00	CARBON	5.6K	5%	1/6W	
R313	1-247-879-00	CARBON	100K	5%	1/6W	
R316	1-247-863-00	CARBON	22K	5%	1/6W	
R317	1-247-831-00	CARBON	1K	5%	1/6W	
R318	1-247-859-00	CARBON	15K	5%	1/6W	
R319	1-247-829-00	CARBON	820	5%	1/6W	
R320	1-247-903-00	CARBON	1M	5%	1/6W	
R321	1-247-879-00	CARBON	100K	5%	1/6W	
R322	1-247-831-00	CARBON	1K	5%	1/6W	
R323	1-247-829-00	CARBON	820	5%	1/6W	
R324	1-249-429-11	CARBON	10K	5%	1/6W	
R326	1-249-419-11	CARBON	1.5K	5%	1/6W	
R327	1-247-881-00	CARBON	120K	5%	1/6W	
R328	1-247-863-00	CARBON	22K	5%	1/6W	
R329	1-247-833-00	CARBON	1.2K	5%	1/6W	
R330	1-247-843-00	CARBON	3.3K	5%	1/6W	
R331	1-247-885-00	CARBON	180K	5%	1/6W	
R332	1-247-859-00	CARBON	15K	5%	1/6W	
R333	1-247-903-00	CARBON	1M	5%	1/6W	
R334	1-249-429-11	CARBON	10K	5%	1/6W	
R335	1-247-875-00	CARBON	68K	5%	1/6W	
R336	1-247-867-00	CARBON	33K	5%	1/6W	
R337	1-247-881-00	CARBON	120K	5%	1/6W	
R338	1-247-879-00	CARBON	100K	5%	1/6W	
R339	1-247-879-00	CARBON	100K	5%	1/6W	
R340	1-247-873-00	CARBON	56K	5%	1/6W	
R341	1-247-857-00	CARBON	12K	5%	1/6W	
R342	1-249-429-11	CARBON	10K	5%	1/6W	
R343	1-247-841-00	CARBON	2.7K	5%	1/6W	
R344	1-249-429-11	CARBON	10K	5%	1/6W	
R345	1-215-473-00	METAL	150K	1%	1/6W	
R346	1-247-863-00	CARBON	22K	5%	1/6W	
R347	1-247-863-00	CARBON	22K	5%	1/6W	
R348	1-247-859-00	CARBON	15K	5%	1/6W	
R349	1-249-429-11	CARBON	10K	5%	1/6W	
R350	1-215-467-00	METAL	82K	1%	1/6W	
R351	1-249-437-11	CARBON	47K	5%	1/6W	
R352	1-247-863-00	CARBON	22K	5%	1/6W	
R353	1-247-831-00	CARBON	1K	5%	1/6W	
R354	1-249-429-11	CARBON	10K	5%	1/6W	
R355	1-247-869-00	CARBON	39K	5%	1/6W	
R356	1-249-429-11	CARBON	10K	5%	1/6W	
R357	1-249-429-11	CARBON	10K	5%	1/6W	
R358	1-247-853-00	CARBON	8.2K	5%	1/6W	
R359	1-249-429-11	CARBON	10K	5%	1/6W	
R360	1-247-879-00	CARBON	100K	5%	1/6W	
R361	1-247-863-00	CARBON	22K	5%	1/6W	
R362	1-247-863-00	CARBON	22K	5%	1/6W	
R363	1-247-859-00	CARBON	15K	5%	1/6W	
R364	1-247-869-00	CARBON	39K	5%	1/6W	
R365	1-249-421-11	CARBON	2.2K	5%	1/6W	
R366	1-247-849-00	CARBON	5.6K	5%	1/6W	
R367	1-247-831-00	CARBON	1K	5%	1/6W	
R368	1-249-429-11	CARBON	10K	5%	1/6W	
R369 ⚠	1-212-366-61	METAL OXIDE	3.3	5%	1W	F
R370	1-247-831-00	CARBON	1K	5%	1/6W	
R371	1-249-437-11	CARBON	47K	5%	1/6W	
R372	1-247-863-00	CARBON	22K	5%	1/6W	
R373	1-249-421-11	CARBON	2.2K	5%	1/6W	
R374	1-247-867-00	CARBON	33K	5%	1/6W	
R375 ⚠	1-249-396-51	CARBON	18	5%	1/6W	F
R376 ⚠	1-212-849-51	FUSIBLE	4.7	5%	1/4W	F
R377	1-247-831-00	CARBON	1K	5%	1/6W	
R378	1-247-823-00	CARBON	470	5%	1/6W	
R379	1-247-863-00	CARBON	22K	5%	1/6W	
R384	1-247-903-00	CARBON	1M	5%	1/6W	
R385	1-247-867-00	CARBON	33K	5%	1/6W	
R386	1-247-831-00	CARBON	1K	5%	1/6W	
R387	1-247-867-00	CARBON	33K	5%	1/6W	
R388	1-249-421-11	CARBON	2.2K	5%	1/6W	
R389	1-249-421-11	CARBON	2.2K	5%	1/6W	
R390	1-247-867-00	CARBON	33K	5%	1/6W	
R391	1-247-877-00	CARBON	82K	5%	1/6W	
R392	1-247-887-00	CARBON	220K	5%	1/6W	
R401	1-247-881-00	CARBON	120K	5%	1/6W	
R402	1-249-429-11	CARBON	10K	5%	1/6W	
R403	1-249-421-11	CARBON	2.2K	5%	1/6W	
R404	1-247-837-00	CARBON	1.8K	5%	1/6W	
R405	1-249-429-11	CARBON	10K	5%	1/6W	
R406	1-247-851-00	CARBON	6.8K	5%	1/6W	
R407	1-249-437-11	CARBON	47K	5%	1/6W	
R408	1-247-881-00	CARBON	120K	5%	1/6W	
R409	1-247-873-00	CARBON	56K	5%	1/6W	
R410	1-249-434-11	CARBON	27K	5%	1/6W	
R411	1-247-879-00	CARBON	100K	5%	1/6W	
R412	1-247-859-00	CARBON	15K	5%	1/6W	
R413	1-249-437-11	CARBON	47K	5%	1/6W	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
R416	1-249-437-11	CARBON	47K	5%	1/6W	
R417	1-247-859-00	CARBON	15K	5%	1/6W	
R418	1-247-887-00	CARBON	220K	5%	1/6W	
R701	1-249-429-11	CARBON	10K	5%	1/6W	
R702	1-247-891-00	CARBON	330K	5%	1/6W	
R703	1-247-817-00	CARBON	270	5%	1/6W	
R704	1-249-437-11	CARBON	47K	5%	1/6W	
R705	1-247-823-00	CARBON	470	5%	1/6W	
R706	1-247-857-00	CARBON	12K	5%	1/6W	
R707	1-247-843-00	CARBON	3.3K	5%	1/6W	
R708	1-247-875-00	CARBON	68K	5%	1/6W	
R709	1-249-429-11	CARBON	10K	5%	1/6W	
R711	1-247-863-00	CARBON	22K	5%	1/6W	
R712	1-247-883-00	CARBON	150K	5%	1/6W	
R713	1-210-825-00	SOLID	3.3M	5%	1/4W	
R714	1-247-875-00	CARBON	68K	5%	1/6W	
R715	1-249-437-11	CARBON	47K	5%	1/6W	
R716	1-247-831-00	CARBON	1K	5%	1/6W	
R717	1-247-204-00	CARBON	33	5%	1/2W	F
R718	1-247-831-00	CARBON	1K	5%	1/6W	
R719	1-247-841-00	CARBON	2.7K	5%	1/6W	
R720	1-247-859-00	CARBON	15K	5%	1/6W	
R721	1-249-387-11	CARBON	3.3	5%	1/6W	F
R722	1-249-429-11	CARBON	10K	5%	1/6W	
R723	1-247-849-00	CARBON	5.6K	5%	1/6W	
R724	1-247-783-00	CARBON	10	5%	1/6W	
R725	1-249-421-11	CARBON	2.2K	5%	1/6W	
R726	1-249-434-11	CARBON	27K	5%	1/6W	
R727	1-247-859-00	CARBON	15K	5%	1/6W	
R728	1-247-853-00	CARBON	8.2K	5%	1/6W	

VARIABLE RESISTOR

RV301	1-228-997-00	RES, ADJ, METAL GLAZE 100K
RV302	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV303	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV304	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV305	1-228-994-00	RES, ADJ, CARBON 10K
RV306	1-228-991-00	RES, ADJ, CARBON 2.2K
RV307	1-228-996-00	RES, ADJ, CARBON 47K
RV308	1-228-996-00	RES, ADJ, CARBON 47K
RV702	1-228-999-00	RES, ADJ, METAL GLAZE 470K

TRANSFORMER

T701	1-433-275-00	TRANSFORMER, BIAS OSCILLATOR

THERMISTOR

TH001	1-800-200-00	THERMISTOR S-3K

CRYSTAL

X001	1-527-822-00	OSCILLATOR, CERAMIC

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Ref.No	Part No.	Description	Remark
	*1-616-382-11	FU-40 BOARD	

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DIODE

D001	8-719-908-50	DIODE SLR-54MC3
D002	8-719-908-53	DIODE SLR-54DC3

VARIABLE RESISTOR

RV307	1-230-122-00	RES, VAR, CARBON 100K

SWITCH

S001	1-553-856-00	SWITCH, KEY BOARD
S002	1-553-856-00	SWITCH, KEY BOARD
S003	1-553-856-00	SWITCH, KEY BOARD
S004	1-553-856-00	SWITCH, KEY BOARD
S005	1-553-856-00	SWITCH, KEY BOARD
S006	1-553-856-00	SWITCH, KEY BOARD
S007	1-553-856-00	SWITCH, KEY BOARD

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*A-6721-256-A TT-13 BOARD, COMPLETE

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CAPACITOR

C101	1-123-612-00	ELECT	2.2MF	20%	50V
C102	1-123-902-00	ELECT	0.68MF	20%	50V
C103	1-161-047-00	CERAMIC	0.0047MF	20%	25V
C104	1-123-617-00	ELECT	10MF	20%	16V
C105	1-161-494-00	CERAMIC	0.022MF	30%	25V
C106	1-161-494-00	CERAMIC	0.022MF	30%	25V
C107	1-123-356-00	ELECT	10MF	20%	16V
C108	1-101-004-00	CERAMIC	0.01MF		50V
C109	1-162-294-31	CERAMIC	0.001MF	10%	50V
C110	1-162-294-31	CERAMIC	0.001MF	10%	50V
C501	1-123-332-00	ELECT	47MF	20%	16V
C503	1-102-959-00	CERAMIC	22PF	5%	50V
C504	1-162-561-11	CERAMIC	0.1MF		16V
C505	1-123-318-00	ELECT	33MF	20%	16V
C506	1-101-005-00	CERAMIC	0.022MF		50V
C507	1-101-005-00	CERAMIC	0.022MF		50V
C508	1-101-005-00	CERAMIC	0.022MF		50V

TRIMMER

CT501	1-141-022-21	CAP, TRIMMER, CERAMIC

DIODE

D101	8-719-911-19	DIODE 1SS119
D102	8-719-911-19	DIODE 1SS119
D103	8-719-911-19	DIODE 1SS119
D104	8-719-911-19	DIODE 1SS119
D105	8-719-911-19	DIODE 1SS119

When indicating parts by reference number, please include the board name.

TT-13

Ref.No	Part No.	Description	Remark
D106	8-719-911-19	DIODE 1SS119	
D107	8-719-911-19	DIODE 1SS119	
D108	8-719-911-19	DIODE 1SS119	
D109	8-719-911-19	DIODE 1SS119	
D110	8-719-911-19	DIODE 1SS119	
D111	8-719-911-19	DIODE 1SS119	
D112	8-719-911-19	DIODE 1SS119	
D113	8-719-911-19	DIODE 1SS119	
D114	8-719-911-19	DIODE 1SS119	
D115	8-719-911-19	DIODE 1SS119	
D116	8-719-911-19	DIODE 1SS119	
D117	8-719-911-19	DIODE 1SS119	
D118	8-719-911-19	DIODE 1SS119	
D119	8-719-911-19	DIODE 1SS119	
D120	8-719-911-19	DIODE 1SS119	
D501	8-719-911-19	DIODE 1SS119	
D502	8-719-911-19	DIODE 1SS119	
D503	8-719-812-31	DIODE TLR123	
D504	8-719-100-54	DIODE RD9.1EB2	
D505	8-719-908-54	DIODE SLR-54VC3	
D506	8-719-911-19	DIODE 1SS119	
D507	8-719-911-19	DIODE 1SS119	
D508	8-719-911-19	DIODE 1SS119	
D510	8-719-908-54	DIODE SLR-54VC3	
D511	8-719-911-19	DIODE 1SS119	

INDICATOR TUBE

Ref.No	Part No.	Description	Remark
FL501	1-519-354-11	INDICATOR TUBE, FLUORESCENT	

IC

Ref.No	Part No.	Description	Remark
IC101	8-759-600-44	IC M54836AP	
IC501	8-759-104-11	IC UPD7519G-179	
IC502	8-741-131-70	IC BX-1317	

PRESET UNIT

Ref.No	Part No.	Description	Remark
PU101	1-230-904-11	PRESET UNIT	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q101	8-729-245-83	TRANSISTOR 2SC2458	
Q102	8-729-900-89	TRANSISTOR DTC144ES	
Q103	8-729-900-89	TRANSISTOR DTC144ES	
Q104	8-729-900-89	TRANSISTOR DTC144ES	
Q105	8-729-900-65	TRANSISTOR DTA144ES	
Q501	8-729-900-65	TRANSISTOR DTA144ES	
Q502	8-729-900-65	TRANSISTOR DTA144ES	

RESISTOR

Ref.No	Part No.	Description				Remark
R004	1-247-875-00	CARBON	68K	5%	1/6W	
R101	1-247-895-00	CARBON	470K	5%	1/6W	
R102	1-249-434-11	CARBON	27K	5%	1/6W	
R103	1-249-437-11	CARBON	47K	5%	1/6W	
R104	1-247-863-00	CARBON	22K	5%	1/6W	
R105	1-247-863-00	CARBON	22K	5%	1/6W	
R106	1-247-863-00	CARBON	22K	5%	1/6W	
R107	1-247-863-00	CARBON	22K	5%	1/6W	
R108	1-249-429-11	CARBON	10K	5%	1/6W	
R109	1-249-421-11	CARBON	2.2K	5%	1/6W	
R110	1-247-881-00	CARBON	120K	5%	1/6W	
R111	1-247-863-00	CARBON	22K	5%	1/6W	
R112	1-247-863-00	CARBON	22K	5%	1/6W	
R113	1-247-863-00	CARBON	22K	5%	1/6W	
R114	1-247-863-00	CARBON	22K	5%	1/6W	
R115	1-247-863-00	CARBON	22K	5%	1/6W	
R116	1-247-831-00	CARBON	1K	5%	1/6W	
R117	1-247-863-00	CARBON	22K	5%	1/6W	
R501	1-247-847-00	CARBON	4.7K	5%	1/6W	
R502	1-249-437-11	CARBON	47K	5%	1/6W	
R503	1-247-879-00	CARBON	100K	5%	1/6W	
R509	1-247-879-00	CARBON	100K	5%	1/6W	
R510	1-247-879-00	CARBON	100K	5%	1/6W	
R511	1-247-863-00	CARBON	22K	5%	1/6W	
R512	1-247-867-00	CARBON	33K	5%	1/6W	
R513	1-247-879-00	CARBON	100K	5%	1/6W	
R514	1-247-879-00	CARBON	100K	5%	1/6W	
R515	1-247-879-00	CARBON	100K	5%	1/6W	
R516	1-247-879-00	CARBON	100K	5%	1/6W	
R517	1-247-843-00	CARBON	3.3K	5%	1/6W	
R518	1-247-831-00	CARBON	1K	5%	1/6W	
R519	1-247-821-00	CARBON	390	5%	1/6W	
R521	1-247-821-00	CARBON	390	5%	1/6W	

SWITCH

Ref.No	Part No.	Description	Remark
S101	1-553-856-00	SWITCH, KEY BOARD	
S102	1-553-856-00	SWITCH, KEY BOARD	
S103	1-570-338-11	SWITCH, SLIDE	
S501	1-553-856-00	SWITCH, KEY BOARD	
S503	1-553-856-00	SWITCH, KEY BOARD	
S504	1-553-856-00	SWITCH, KEY BOARD	
S505	1-553-856-00	SWITCH, KEY BOARD	
S506	1-553-856-00	SWITCH, KEY BOARD	
S507	1-553-856-00	SWITCH, KEY BOARD	
S508	1-553-856-00	SWITCH, KEY BOARD	
S509	1-553-856-00	SWITCH, KEY BOARD	
S510	1-553-856-00	SWITCH, KEY BOARD	
S511	1-553-856-00	SWITCH, KEY BOARD	
S512	1-553-856-00	SWITCH, KEY BOARD	
S513	1-553-856-00	SWITCH, KEY BOARD	

CRYSTAL

Ref.No	Part No.	Description	Remark
X501	1-527-647-00	OSCILLATOR, CRYSTAL	

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When indicating parts by reference number, please include the board name.

*1-613-233-12 RD-21 BOARD

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DIODE

Ref.No	Part No.	Description	Remark
PC101	8-719-913-41	DIODE SPI201-22	

RESISTOR

Ref.No	Part No.	Description				Remark
R101	1-247-815-00	CARBON	220	5%	1/6W	
R102	1-247-867-00	CARBON	33K	5%	1/6W	
R103	1-247-859-00	CARBON	15K	5%	1/6W	

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*1-614-597-11 LM-16 BOARD

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*A-6729-312-A PS-92 BOARD, COMPLETE

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Ref.No	Part No.	Description				Remark
	1-247-216-00	CARBON	100	5%	1/2W	
	1-533-189-11	HOLDER, FUSE				

CAPACITOR

Ref.No	Part No.	Description				Remark
C001	⚠1-130-710-11	FILM	0.1MF	20%	250V	
C002	1-124-362-00	ELECT	4700MF	20%	42V	
C003	1-161-051-00	CERAMIC	0.01MF	10%	50V	
C004	1-161-051-00	CERAMIC	0.01MF	10%	50V	
C005	1-123-375-00	ELECT	220MF	20%	63V	
C007	1-123-375-00	ELECT	220MF	20%	63V	

CONNECTOR

Ref.No	Part No.	Description	Remark
CN002	*1-564-028-00	PIN, CONNECTOR 3P	

DIODE

Ref.No	Part No.	Description	Remark
D002	8-719-143-07	DIODE RD4.3E-B	
D003	8-719-143-07	DIODE RD4.3E-B	
D004	8-719-200-02	DIODE 10E-2	
D005	8-719-101-30	DIODE RD39EC2	
D006	8-719-200-02	DIODE 10E-2	
D007	8-719-100-92	DIODE RD24EB4	
D010	⚠8-719-500-29	DIODE S3V10S	
D011	⚠8-719-500-29	DIODE S3V10S	
D012	⚠8-719-500-29	DIODE S3V10S	
D013	⚠8-719-500-29	DIODE S3V10S	

FUSE

Ref.No	Part No.	Description	Remark
F001	⚠1-532-285-11	FUSE, TIME-LAG, T1.25A 250V	
F002	⚠1-532-350-11	FUSE, TIME-LAG, T4A 250V	

TRANSISTOR

Ref.No	Part No.	Description	Remark
Q001	8-729 177-43	TRANSISTOR 2SD774	
Q002	8-729-113-33	TRANSISTOR 2SB733-4	
Q004	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q005	8-729-177-23	TRANSISTOR 2SB772	
Q006	8-729-177-23	TRANSISTOR 2SB772	
Q007	8-729-245-83	TRANSISTOR 2SC2458	

RESISTOR

Ref.No	Part No.	Description				Remark
R001	1-211-587-00	CARBON	7.5	5%	1/2W	
R002	1-247-173-00	CARBON	56K	5%	1/4W	
R003	1-246-543-00	CARBON	820K	5%	1/4W	
R004	1-247-143-00	CARBON	3.3K	5%	1/4W	
R005	1-247-143-00	CARBON	3.3K	5%	1/4W	
R008	1-247-721-11	CARBON	4.7K	5%	1/4W	
R009	1-247-133-00	CARBON	1.2K	5%	1/4W	
R010	1-247-133-00	CARBON	1.2K	5%	1/4W	
R011	1-247-133-00	CARBON	1.2K	5%	1/4W	
R012	1-247-133-00	CARBON	1.2K	5%	1/4W	
R013	1-247-725-11	CARBON	10K	5%	1/4W	

TRANSFORMER

Ref.No	Part No.	Description	Remark
T001	⚠1-448-245-11	TRANSFORMER, POWER	

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*1-616-379-12 PS-93 BOARD

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CAPACITOR

Ref.No	Part No.	Description				Remark
C011	1-123-346-00	ELECT	220MF	20%	35V	
C012	1-161-063-11	CERAMIC	0.1MF	10%	50V	
C013	1-123-330-00	ELECT	22MF	20%	16V	
C014	1-123-850-00	ELECT	1000MF	20%	16V	
C015	1-123-323-00	ELECT	470MF	20%	16V	
C016	1-123-333-00	ELECT	100MF	20%	16V	

CONNECTOR

Ref.No	Part No.	Description	Remark
CN001	*1-564-032-00	PIN, CONNECTOR 7P	

FERRITE BEAD

Ref.No	Part No.	Description	Remark
FB001	1-543-236-11	BEAD, FERRITE	

IC

Ref.No	Part No.	Description	Remark
IC001	8-749-972-17	IC STK7217	

COIL

Ref.No	Part No.	Description	Remark
L001	1-421-701-11	COIL, CHOKE 150UH	
L002	1-408-944-00	COIL, CHOKE 20UH	
L003	1-408-944-00	COIL, CHOKE 20UH	

RESISTOR

Ref.No	Part No.	Description				Remark
R015	1-247-801-00	CARBON	56	5%	1/6W	

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The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
	*1-616-380-13	VS-5 BOARD ***********	
	*3-695-351-01	PLATE, INDICATION, VOLTAGE	
		SWITCH	
S001	⚠.1-553-011-11	SWITCH, POWER VOLTAGE SELECTION	

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MISCELLANEOUS
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Ref.No	Part No.	Description	Remark
	A-4910-063-A	R STATOR (REEL MOTOR) BOARD, COMPLETE (M903)	
	A-6761-096-A	ACE ASSY	
	X-3679-268-1	MOTOR ASSY, L (LOADING/THREADING) (M904)	
	X-3693-829-1	SENSOR BLOCK ASSY, S (SUPPLY SENSOR) (L901)	
	X-3693-830-1	SENSOR BLOCK ASSY, T (TAKE-UPSENSOR) (L902)	
	⚠.1-454-349-61	SOLENOID, PLUNGER (PINCH) (PM901)	
	⚠.1-454-371-31	SOLENOID, PLUNGER (BRAKE) (PM902)	
	⚠.1-464-481-12	BOOSTER MIXER, RF MODULATOR (RFU-829)	
	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF/CASSETTE DOWN)	
	1-554-840-11	SWITCH, LEAF (THREADING END) (S903)	
	*1-556-934-11	CABLE, PIN	
	⚠.1-558-097-12	CORD, POWER	
	8-825-508-10	HEAD, FE (FULL ERASE HEAD)	
	8-838-070-01	MOTOR, DC (BHF-1907B)	
S904	1-554-840-11	SWITCH, LEAF (CASSETTE IN)	
TU701	⚠.1-463-584-11	TUNER ET (BT-881A)	

****

ACCESSORIES AND PACKING MATERIALS
****

Part No.	Description	Remark
A-6765-920-A	COMMANDER ASSY (RMT-226) (SILVER)	
A-6765-921-A	COMMANDER ASSY (RMT-226) (GRAY)	
A-6767-079-A	COMMANDER ASSY (RMT-226) (BLACK)	
A-6767-414-A	COMMANDER ASSY (RMT-226) (RED)	
1-556-893-00	CORD ASSY, COAXIAL	
1-551-513-00	CORD CONNECTION	
*3-681-287-01	LID, ACCESSORY CASE	
*3-684-259-01	CASE, ACCESSORY	
3-695-308-01	DRIVER, TUNING	
*3-677-503-00	SHEET, PROTECTION	
*3-695-325-01	CUSHION (UPPER)	
*3-695-326-01	CUSHION (LOWER)	
*3-695-343-01	COVER, DUST	
*3-695-349-01	INDIVIDUAL CARTON (SILVER)	
*3-695-349-11	INDIVIDUAL CARTON (GRAY)	
*3-695-349-21	INDIVIDUAL CARTON (BLACK)	
*3-695-349-71	INDIVIDUAL CARTON (RED)	
3-760-755-41	MANUAL, INSTRUCTION	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 7
ADJUSTMENTS

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1. PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

Note : Regarding the removal procedures of the cabinet and board, see Section 2.

1-1. OPERATION OF THE UNIT WITH THE FL CASSETTE COMPARTMENT REMOVED

1-1-1. How to Put the Unit into Threading Completed State when the FL Cassette Compartment is Removed

1) Connect ordinary screwdriver to short the leaf switch ❶ (cassette-on switch).

   Note:
   Be careful that the ordinary screwdriver do not touch any other parts (use tape or other insulation).

2) Press the cassette-down switch ❷ and leave it pressed in, when the power button is turned ON, threading starts.

* Refer to section 3-6 for insturctions on how to removed the FL cassette compartment.

[How to EJECT in this condition]

- Press the EJECT button. When unthreading is completed and the internal gear starts to turn, turn the power OFF.

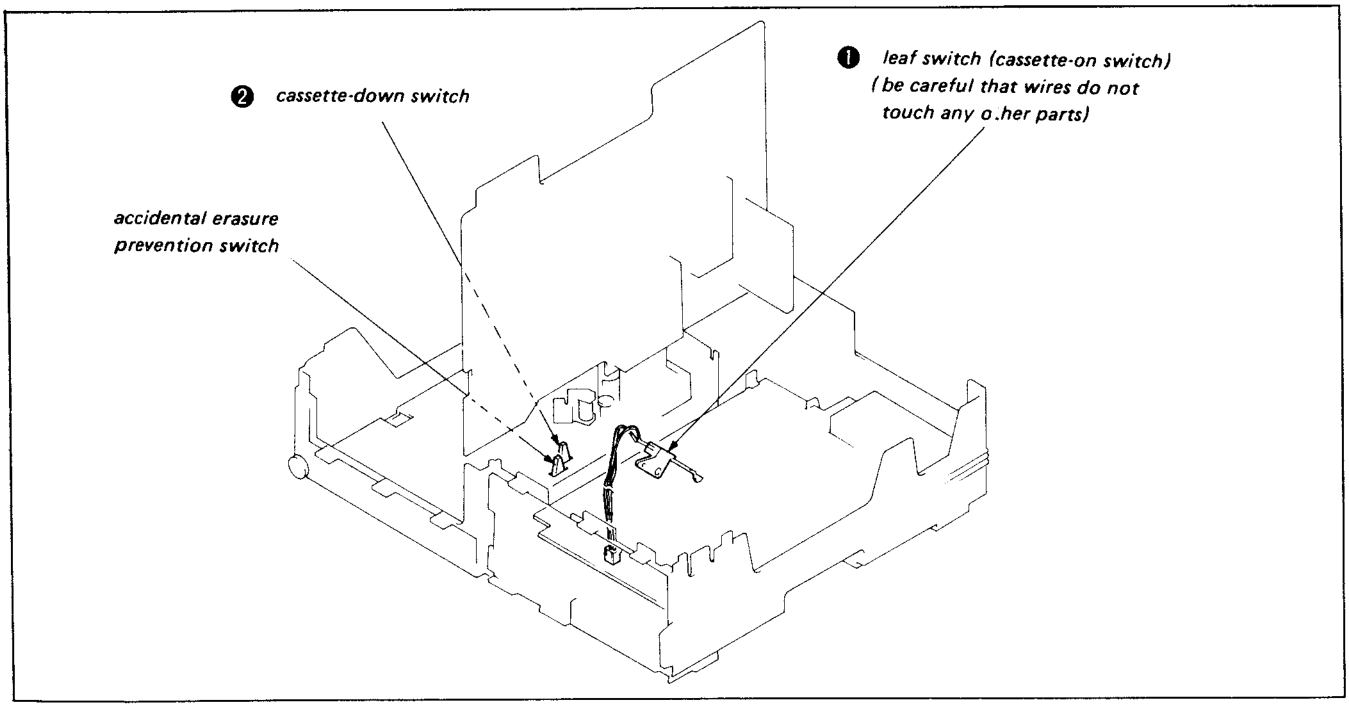

❷ cassette-down switch
❶ leaf switch (cassette-on switch) (be careful that wires do not touch any o.her parts)
accidental erasure prevention switch

Fig. 1-1. How to thread the tape when the FL cassette compartment has been removed

1-1-2. Playback Without Cassette Installed

Complete threading by the procedure described in 1-1-1, then press the playback button.

1-1-3. How to Put in Recording Mode Without Cassette Installed

1) Put the unit into the threading completed state in accordance with the procedure described in 1-1-1.
2) Press the recording button while pressing the accidental erasure prevention switch❶.

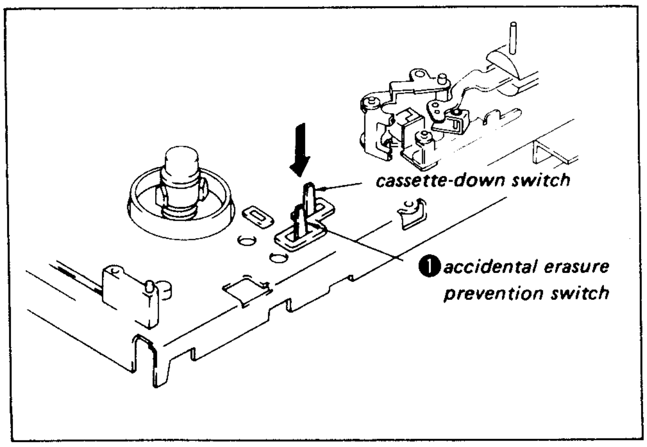

cassette-down switch
❶accidental erasure prevention switch

Fig. 1-2. How to put the recorder in recording mode with the FL cassette compartment removed

1-2. HOW TO LOAD, THREAD, UNLOAD AND UNTHREAD WITH THE POWER OFF

1-2-1. Manual Loading and Unloading

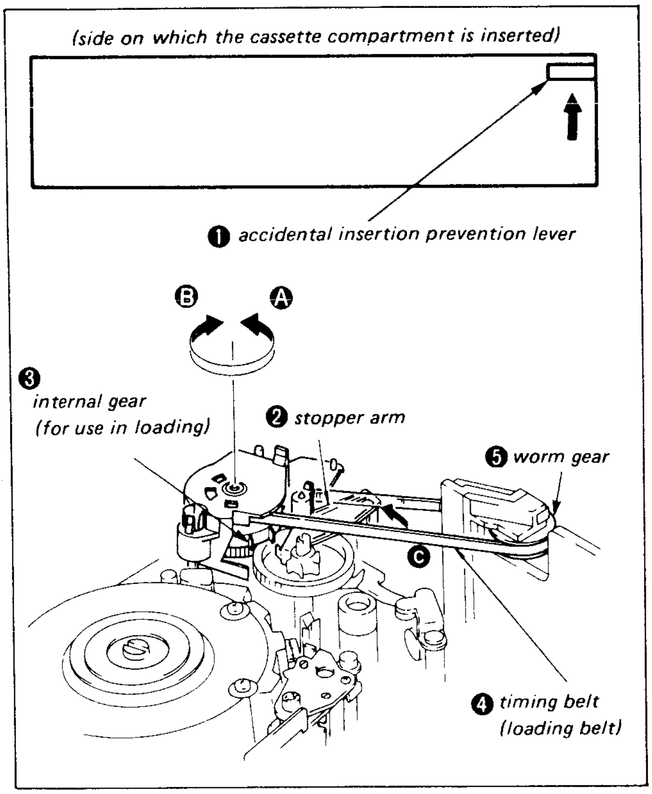

(side on which the cassette compartment is inserted)
① accidental insertion prevention lever
Ⓑ
Ⓐ
③
internal gear
(for use in loading)
② stopper arm
⑤ worm gear
Ⓒ
④ timing belt
(loading belt)

Fig. 1-3. Manual loading and unloading

1) Release the right accidental insertion prevention lever ① inside the cassette compartment, then press the stopper arm ② in the direction of arrow Ⓒ and release the internal gear ③ stop.
2) Turn the internal gear ③ manually in the direction of arrow Ⓐ until loading is completed.
3) To unload, turn the internal gear ③ in the direction of arrow Ⓑ.

Note.

When the loading belt ④ has been removed, load and unload by turning the worm gear ⑤ manually.

1-2-2. Manual Threading and Unthreading

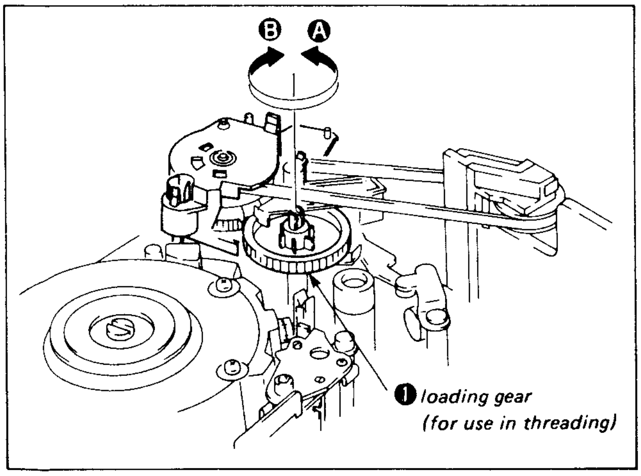

Ⓑ
Ⓐ
① loading gear
(for use in threading)

Fig. 1-4. Manual threading and unthreading

1) Turn the loading gear ① in the direction of arrow Ⓐ until loading is completed.
2) To unthread, turn the loading gear ① in the direction of arrow Ⓑ.

Note:

Always turn the loading gear sideways by hand. Never use a screwdriver or other tool.

1-3. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref.No.	Name	Part Code	Carved Jig No.	Use and Remarks
J-1	Torque Measurement Tape	J-6080-003-C	SL-0003C	forward torque and back tension measurement
J-2	Parallel Plate	J-6086-570-A	SL-0657	audio/CTL head lateral adjustment capstan shaft vertical adjustment
J-3	Dental Mirror (handle) Dental Mirror (mirror)	J-6080-029-A J-6080-030-1	SL-5052	tape path and tape traveling adjustment check
J-4	Alignment Tape (KR5-2H)	8-969-995-52	——	tracking, overall adjustment of picture quality, etc.
J-5	Cleaning Fluid	Y-2031-001-0	——	
J-6	Thickness Gauge	9-911-053-00		
J-7	Chamois Cloth	2-034-697-00	——	cleaning
J-8	Head Demagnetizer	widely available	——	demagnetization of video head and audio head
J-9	Cleaning Cassette Tape	8-888-004-00	——	video head cleaning
J-10	Dihedral Adjustment Screw	J-6080-013-A	SL-0013	video dihedral adjustment
J-11	Video Head Checker	7-732-080-01	SL-5151	

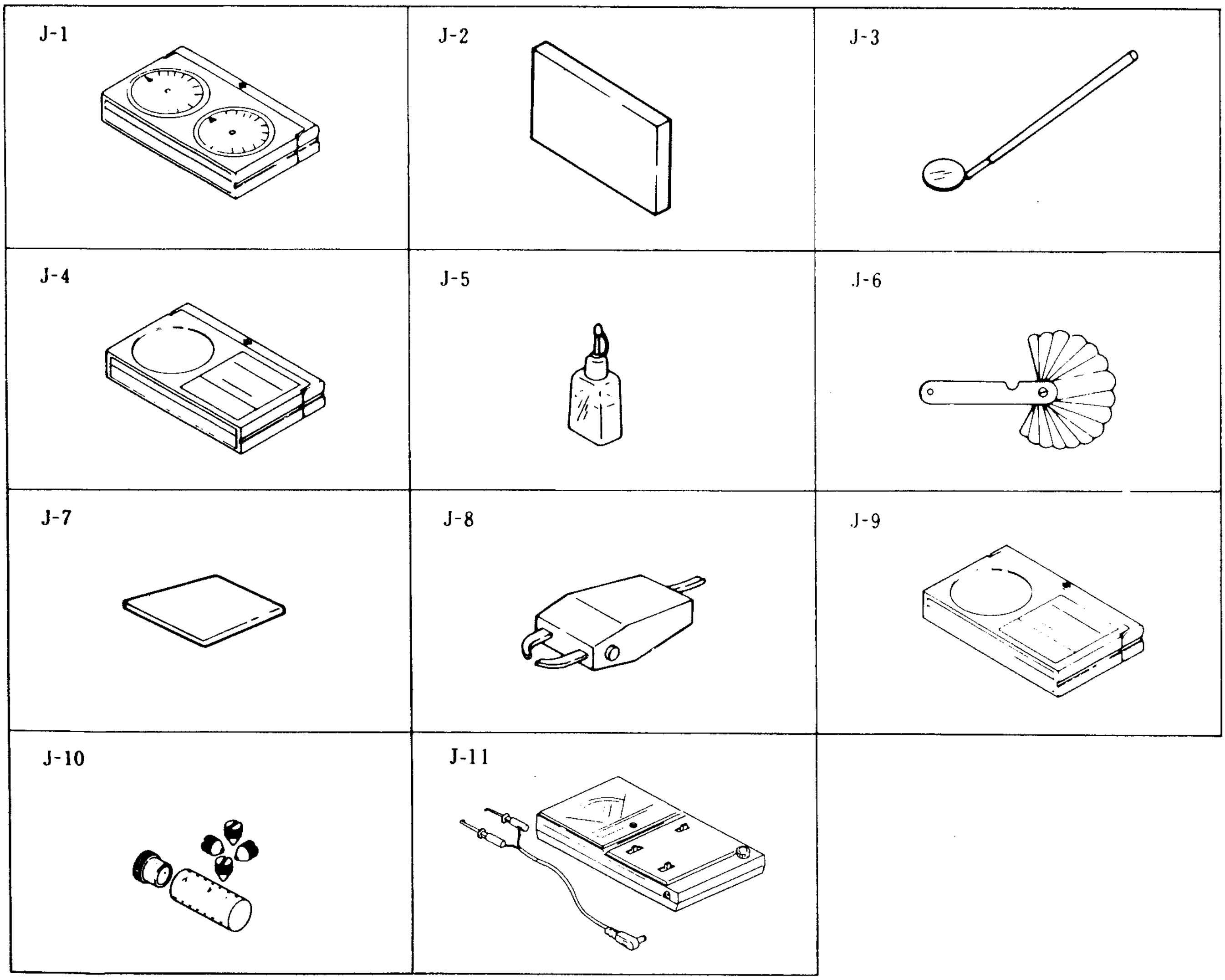


Fig. 1-5. Tools and fixtures required for servicing

2. PERIODIC CHECK AND MAINTENANCE

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

2-1. POST-REPAIR MAINTENANCE

The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1-1. Cleaning of Rotating Head Disk Assembly

1) Press a chamois cloth (Jig Ref. No. J-7) which has been dipped in cleaning fluid (Jig Ref. No. J-5) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a right angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-1-2. Cleaning of the Tape Movement System

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in in cleaning fluid.

2-1-3. Cleaning the Drive System

1) Clean the driving parts with a cloth that has been dipped in cleaning fluid.

parts requiring cleaning

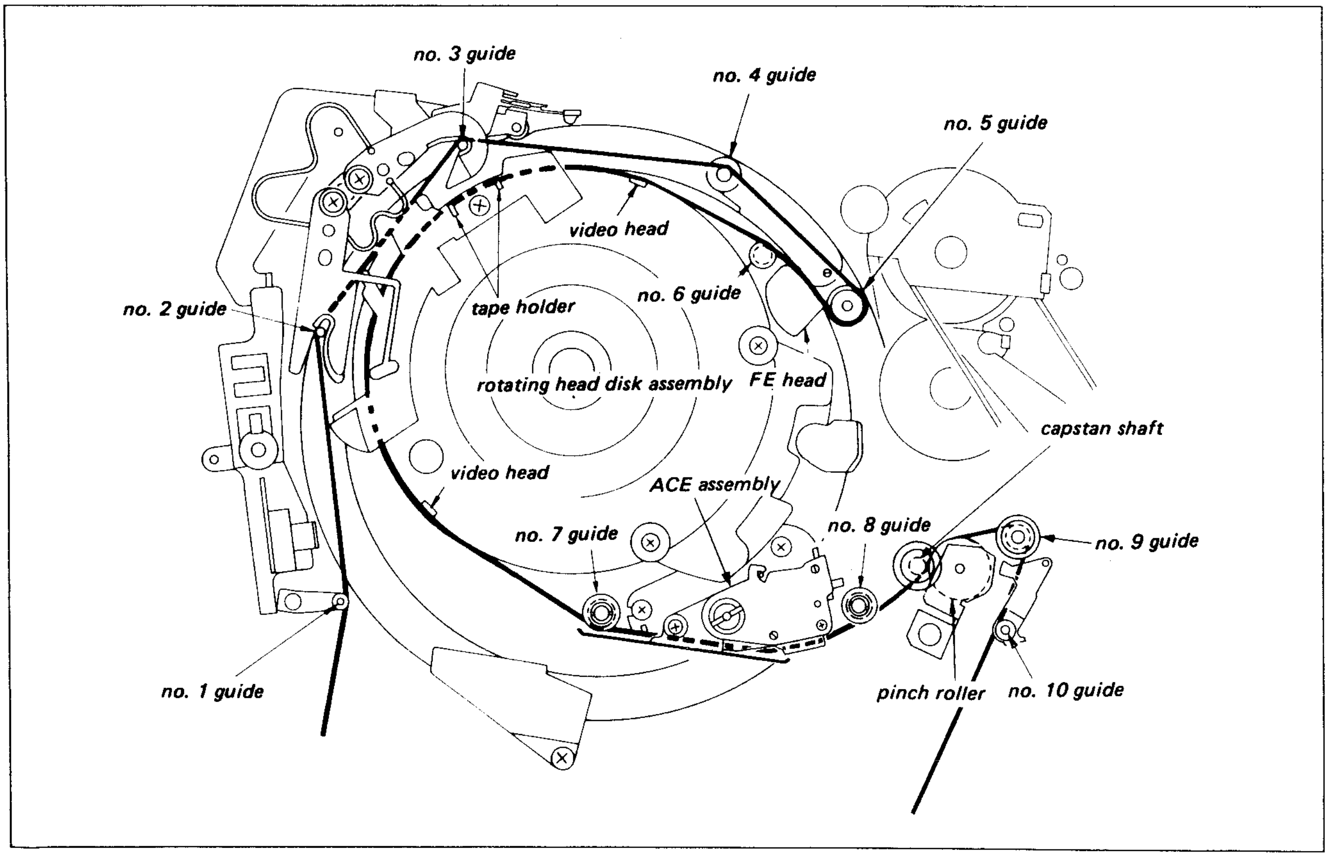

no. 3 guide
no. 4 guide
no. 5 guide
video head
tape holder
no. 6 guide
no. 2 guide
rotating head disk assembly
FE head
capstan shaft
video head
ACE assembly
no. 7 guide
no. 8 guide
no. 9 guide
no. 1 guide
pinch roller
no. 10 guide

Fig. 2-1. Parts requiring cleaning

2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, accoring to user's operating hours.

Maintenance & Check		Operating Hours (H) Replacement Part No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Trans-Portation System	Cleaning of tape transportation system	——	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE ass'y	——	○	○	○	○	○	○	○	○	○	○	
	Cleaning & degaussing of video disk ass'y	——	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Driving System	Loading belt (synchro belt)	3-684-264-01	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	This cleaning must be done whenever a repair is made.
	Cleaning of iron core and opening of solenoid	——	–	–	–	○	–	–	–	○	–	–	Wipe iron core and opening of solenoid with dry cloth.
Performance Confirmation	Abnormal sound		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension		–	☆	–	☆	–	☆	–	☆	–	☆	Confirmation must be made according to section 3-13. Specified value: adjust to 35 ± 3g•cm (When measured with torque cassette tape)
	Confirmation of brake system		–	☆	–	☆	–	☆	–	☆	–	☆	
	Confirmation of record & playback functions		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 80 ± 5 g·cm (SL-0003C)

○ Cleaning ★ Replacement ☆ Confirmation

Note:

On overhaul

When overhauling the unit, replace parts as indicated in the above table.

3. CHECK, ADJUSTMENT AND REPLACEMENT PROCEDURES

STATE OF WEAR OF VIDEO HEADS CHECK

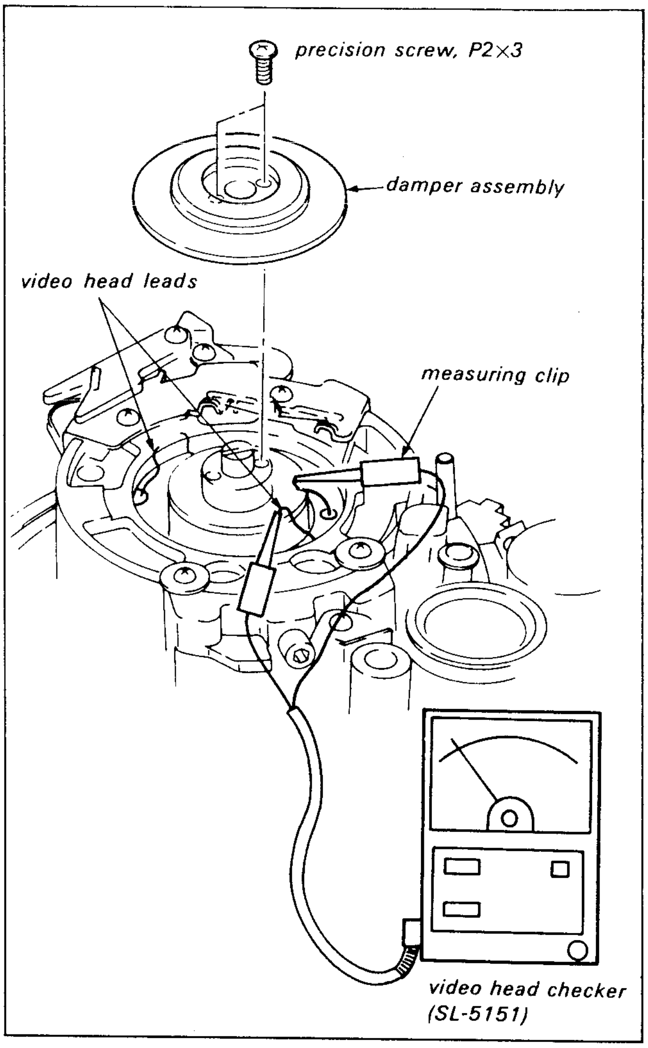
As the accuracy of the check depends on the state of the heads and precision of the checker, the results should be taken only as an indication of the state of wear.

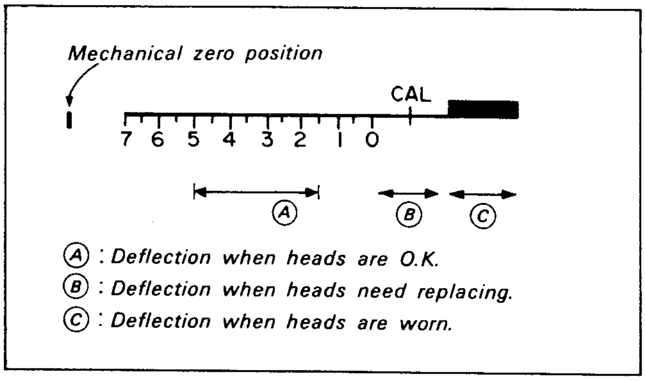
[Adjustment of video head checker]

1) Mechanical zero
   Verify that the pointer of the video head checker is at the mechanical zero position. If it is not at this position, adjust the mechanical zero control.
2) Battery voltage check
   Set the MODE switch to "BATT" and set the POWER switch to "ON". The deflection of the pointer should be within the range marked "BATT". If not, replace the battery (use a 6F22 battery) as follows.
3) Calibration check
   Set the POWER switch to "ON" and the MODE switch to "CAL", then adjust the CAL control so that the pointer is on the CAL mark.
   Note 1: Be sure to carry out this adjustment whenever the RANGE switch is changed.
   Note 2: Be sure to check CAL before measuring the head and proceed the measurement after adjusting CAL, if CAL is not properly set.

[Method of measurement]

1) Remove the two screws that hold the damper assembly in place, then remove the damper assembly.
2) Detach the lead wires on the 2 video heads.
3) Attach the measuring clips to the head leads.
   Be sure to separate the leads by at least 1.5 cm.
4) Set RANGE switch to "B" and MODE switch to "MEAS". The pointer will deflect to indicate the state of wear of the heads.
   Note: The deflection for the 2 video heads may be different, so be sure to measure both.


precision screw, P2×3
damper assembly
video head leads
measuring clip
video head checker
(SL-5151)


Mechanical zero position
CAL
7 6 5 4 3 2 1 0
Ⓐ
Ⓑ
Ⓒ
Ⓐ : Deflection when heads are O.K.
Ⓑ : Deflection when heads need replacing.
Ⓒ : Deflection when heads are worn.

MEASURED VALUE

3-1. REPLACEMENT OF ROTATING HEAD DISK ASSEMBLY

3-1-1. Removal of the Rotating Head Disk Assembly (Fig. 3-1)

1) Remove the adjustment plates 2 and 3 Ⓐ in accordance with the repalcement of the drum assembly 1), 2) and 3) described in 3-3-1.
2) Remove the two screws ① that hold the damper assembly in place, then remove the damper assembly ② .
3) Use a hexagonal wrench to remove the hexagonal socket bolt ③ that holds the upper drum assembly in place, then remove the upper drum assembly ④ .
4) Unsolder ⑥ the rotating head disk ⑤ relay plate (4 red and white leads).
5) Remove the two hexagonal socket bolts ⑦ holding rotating head disk assembly ⑤ in place, then remove the rotating head disk assembly.

Note:
Be careful not to touch the head tip with the hand or bang anything against it.

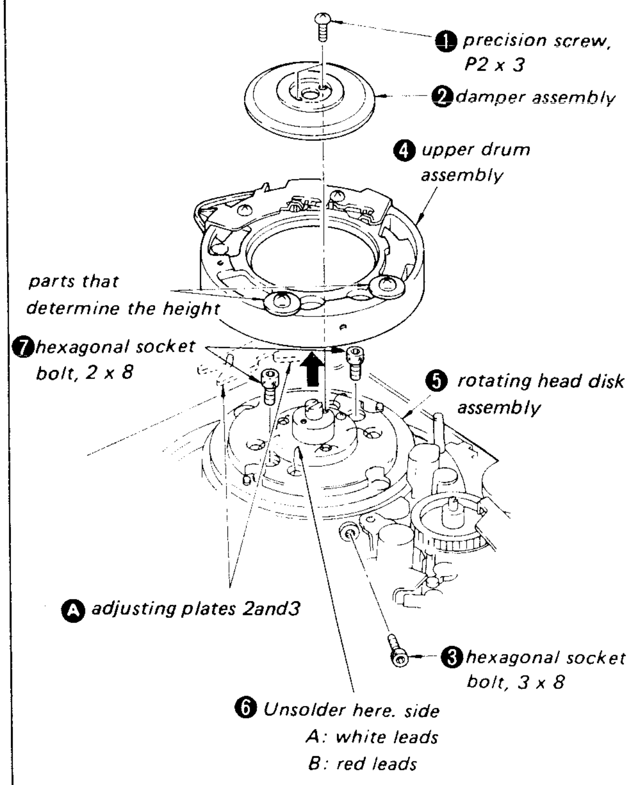

① precision screw, P2 x 3
② damper assembly
④ upper drum assembly
parts that determine the height
⑦ hexagonal socket bolt, 2 x 8
⑤ rotating head disk assembly
Ⓐ adjusting plates 2and3
③ hexagonal socket bolt, 3 x 8
⑥ Unsolder here. side
A: white leads
B: red leads

Fig. 3-1. Removal of the rotating head disk assembly I

3-1-2. Mounting of the Rotating Head Disk Assembly (Fig. 3-1)

1) Insert rotating head disk ⑤ in place, being careful of the direction so that the red and white leads are in the right places.
2) Tighten hexagonal socket bolt· ⑦ and solder the lead wires.

Note :
Be careful to solder the lead wires correctly and not to break any wires.

3) Attach the upper drum, being careful (as during removal) not to move the adjusting plate. While pressing the two points that determine the height, tighten hexagonal socket bolt ③ .

Note:
When inserting the upper drum, be careful that it does not touch the head tip.

Note :
When replacing the rotating drum head, it can happen that the rotating head disk assembly will be hard to remove. In such a case, remove it using the method explained below (Fig. 3-2).

1) Remove the hexagonal socket bolts ① that hold the rotating head disk assembly in place.
2) When the head disk is jammed on tight and is hard to remove, screw the hexagonal socket bolts removed in step ② into the threaded holes removed from the original holes by 90°. Tighten them a little at a time. The head disk will be lifted up by the two screws and will come off easily.

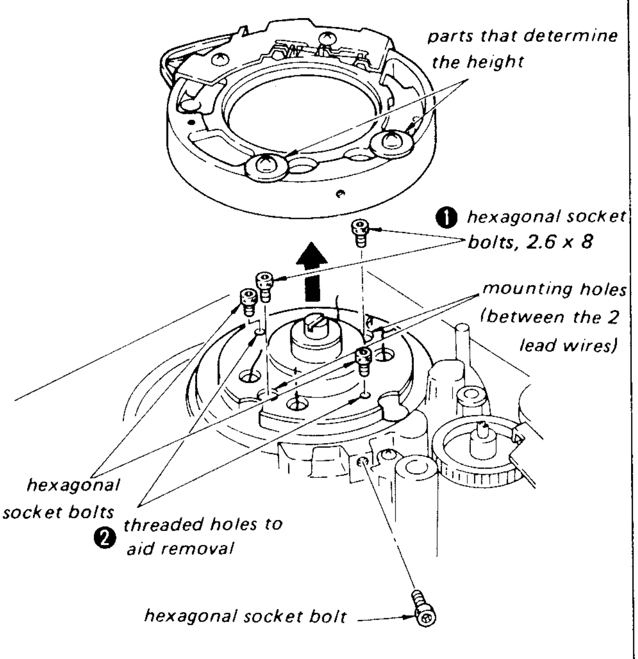

parts that determine the height
① hexagonal socket bolts, 2.6 x 8
mounting holes (between the 2 lead wires)
hexagonal socket bolts
② threaded holes to aid removal
hexagonal socket bolt

Fig. 3-2. Removal of the rotating head disk assembly II

3-2. VIDEO HEAD DIHEDRAL CHECK AND ADJUSTMENT

This adjustment is generally unnecessary, but it is sometimes necessary when the video head disk is replaced. (The video head disk used for maintenance has been precision adjusted at the factory using a microscope and almost never needs to be readjusted.)

When judging whether the video head dihedral angle is correct, the alignment tape is played back. When this is done the tracking control knob must be in the centering position. If the check is done with this knob in other than the center click position (if the tracking is off-center), even if the dihedral angle is correct the picture will be reproduced as if it were off.

Before this adjustment is performed, the ACE assembly position, play back the monoscope section of the alignment path adjustment is described) must be completed.

[Method of checking]

With the tracking control knob set to the center click position, play back the monoscope section of the alignment tape. Check to see if any of the vertical monoscope lines immediately below the switching pulse are reproduced double. If not, the dihedral angle is correct and does not have to be adjustment. If so, perform the adjustment as explained below.

[Method of adjustment]

1) As shown in Fig. 3-3, screw two dihedral angle adjustment screws (Jig Ref. No. J-10) into the adjustment screw holes on the side on which the red lead wires from the video head are connected, until the top of the screw is level with the video head disk. (If they are not screwed in far enough, the video head disk will not turn past the point where the top of the adjustment screw strikes the upper drum. Conversely, if it is screwed in too far, the head base will be moved, throwing the video head dihedral angle way off.)

   Note:

   The side on which the white lead wires are connected is the reference side and must not be moved.
2) Screw one of the two adjustment screws in a little bit farther until resistance is felt. Beyond this point, turning the screw still farther will move the video head, adjusting the dihedral angle.
3) With the adjustment screws in place, play the monoscope signal section of the alignment tape and see how the lines are reproduced. If the vertical lines are split apart more than before, turn the screw which was screwed in more tightly counterclockwise to loosen it, then adjust by tightening the other screw.
4) After the adjustment is completed, remove the adjustment screws and play the tape again to reconfirm that the adjustment is correct.

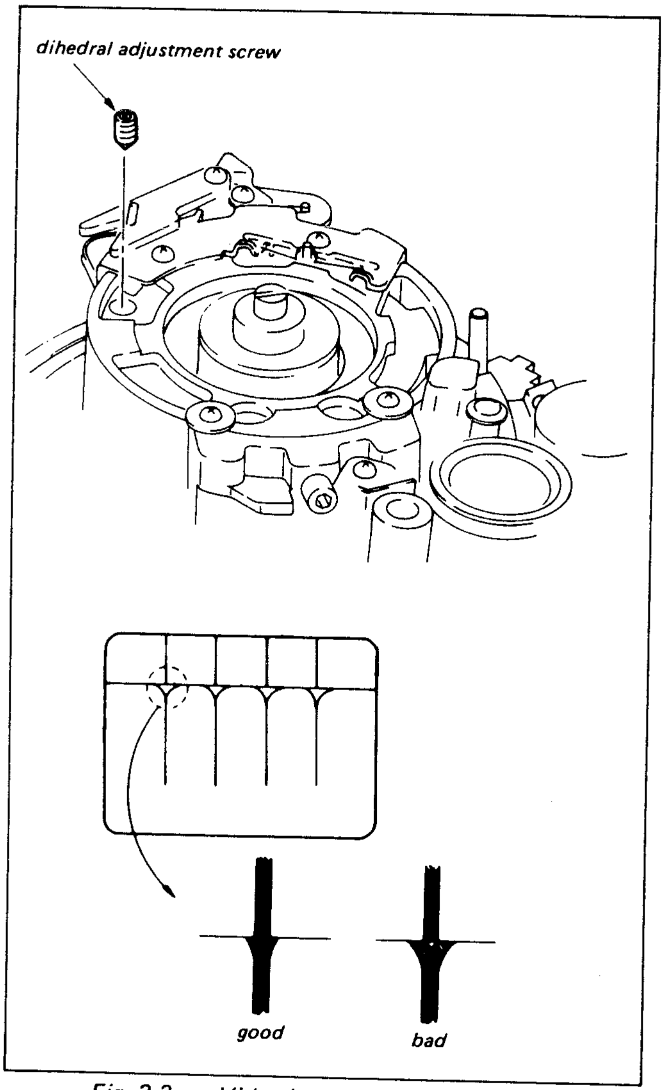
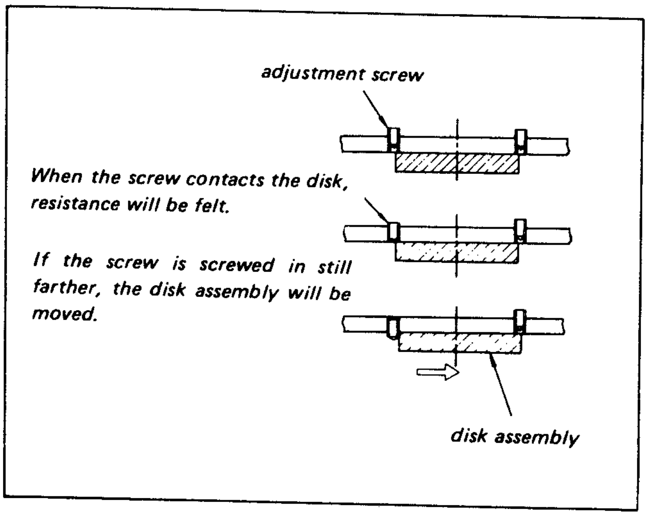


Fig. 3-3. Video head dihedral adjustment



When the screw contacts the disk, resistance will be felt.

If the screw is screwed in still farther, the disk assembly will be moved.

Fig. 3-4.

3-3. REPLACEMENT AND ADJUSTMENT OF THE DRUM ASSEMBLY

3-3-1. Replacement of the Drum Assembly

1) Measure gap Ⓐ between adjusting plate 2 and 3 and the upperdrum holder section and record the measurement.
   Note:
   The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.
2) Measure gap Ⓑ between adjusting plate 2 and 3 and the upperdrum holder section, and record the measurement.
   Note:
   The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.
3) Remove the screws shown in Fig. 3-5, then remove the tape guide ground plate and adjusting plates 2 and 3 ❷.
4) Remove the 3 connectors ❸ from the rear of the chassis as shown in Fig. 3-6.
5) Remove the 3 drum mounting screws ❹ from the rear of the chassis, then remove the main body of the drum assembly ❺. After the replacement has been completed, adjust the drum path.

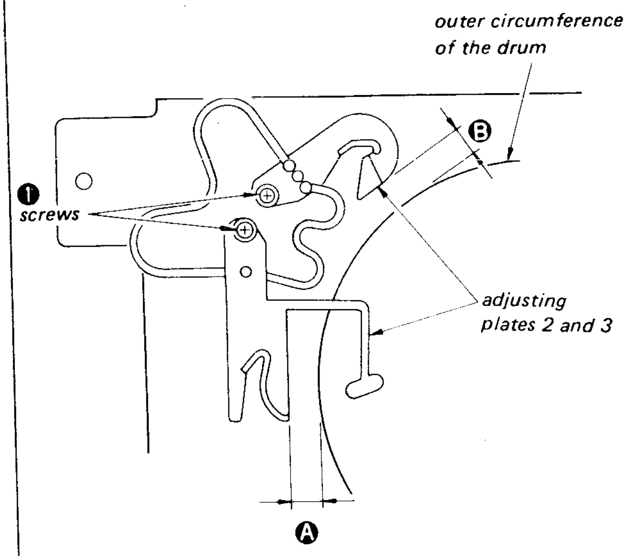

outer circumference of the drum
Ⓑ
❶ screws
adjusting plates 2 and 3
Ⓐ

Fig. 3-5. *Measurement of the position of adjusting plates 2 and 3*

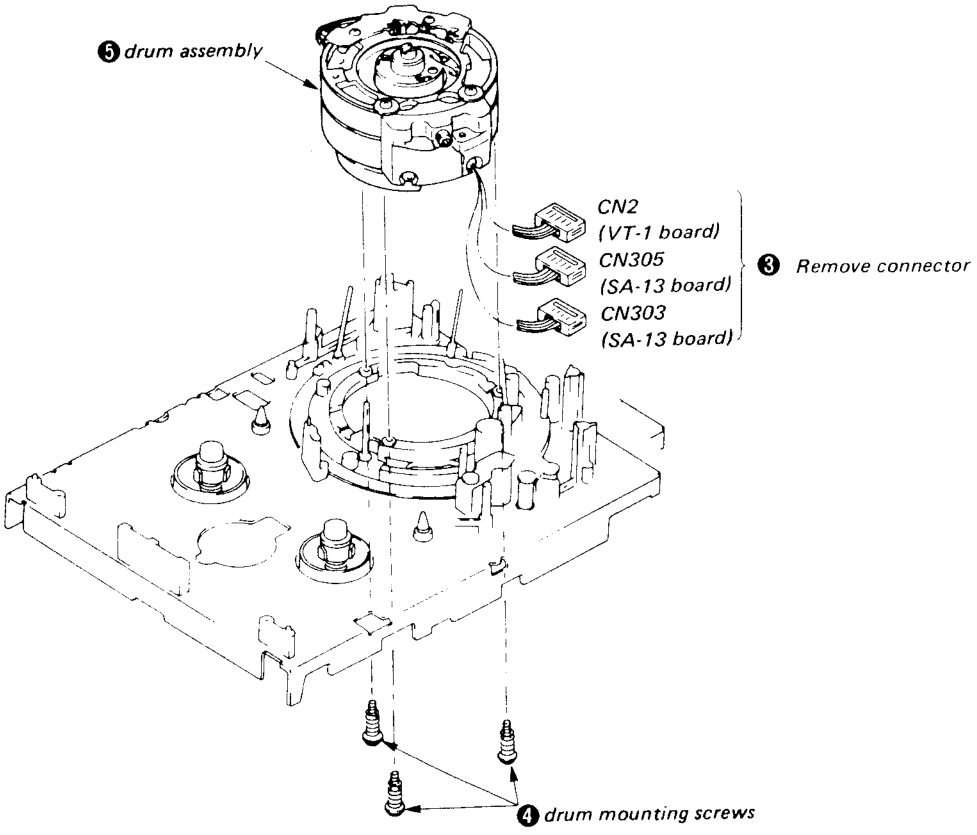

❺ drum assembly
CN2 (VT-1 board)
CN305 (SA-13 board)
CN303 (SA-13 board)
❸ Remove connector
❹ drum mounting screws

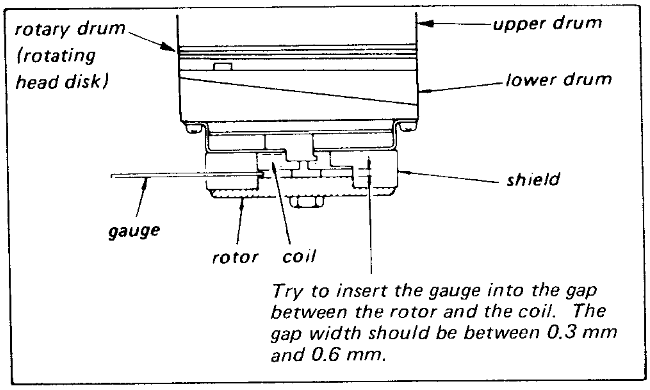
Fig. 3-6. *Removal of the drum assembly*

3-3-2. Adjustment of the Motor Gap when Replacing the Drum Assembly

After replacing the drum assembly, adjust the gap between the motor rotor and the coil to 0.3 mm to 0.6 mm (Fig. 3-7).

[Procedure]

1) When re-assembling the drum, use the spacers which were removed to produce a gap of between 0.3 mm and 0.6 mm. Measure the gap using the gauge that comes with the drum for assembly and maintenance use. One side of the gauge is 0.3 mm and the other side is 0.6 mm If the gap is adjusted correctly, the 0.3 mm side should fit in and the 0.6 mm side should not.
2) If this fails to give the correct gap width, do not use the spacers which were removed, instead, use a combination of the 40.3 mm accessory spacers to obtain the correct width.

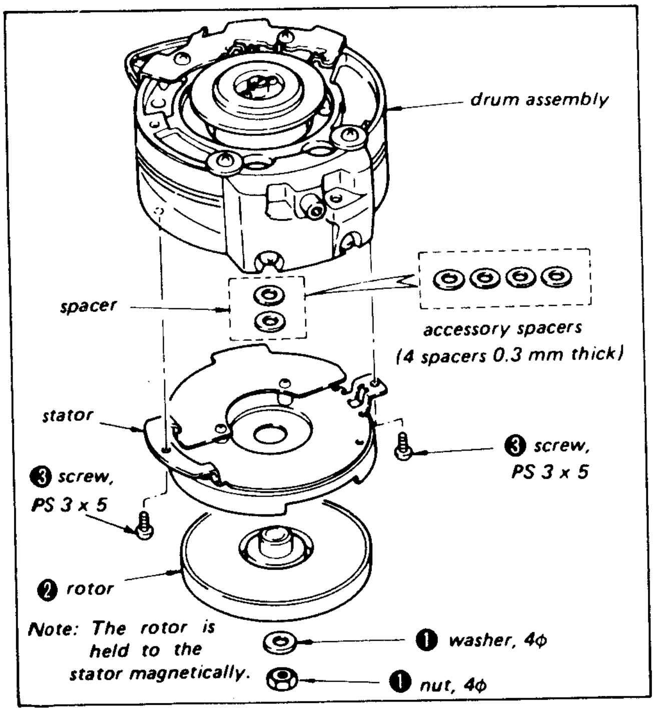

rotary drum (rotating head disk)
upper drum
lower drum
shield
gauge
rotor
coil

Try to insert the gauge into the gap between the rotor and the coil. The gap width should be between 0.3 mm and 0.6 mm.

Fig. 3-7. Checking the motor gap width after replacing the drum assembly

Removal of the stator and rotor when replacing the drum

1) Remove the nut and washer ❶.
2) Remove the rotor ❷ from the stator.
3) Remove the 2 screws ❸ then remove the stator from the main body of the drum.


drum assembly
spacer
accessory spacers (4 spacers 0.3 mm thick)
stator
❸ screw, PS 3 x 5
❸ screw, PS 3 x 5
❷ rotor
❶ washer, 4φ
❶ nut, 4φ

Note: The rotor is held to the stator magnetically.

Fig. 3-8. Removal of the stator and rotor when replacing the drum

3-4. REPLACEMENT OF THE CAPSTAN MOTOR

Removal of the Capstan Motor (Fig. 3-9)

- Remove the three screws ❶ then remove the capstan motor from the rear of the mechanical chassis.

  Note:

  When the capstan motor has been removed or replaced, check the tape path once.

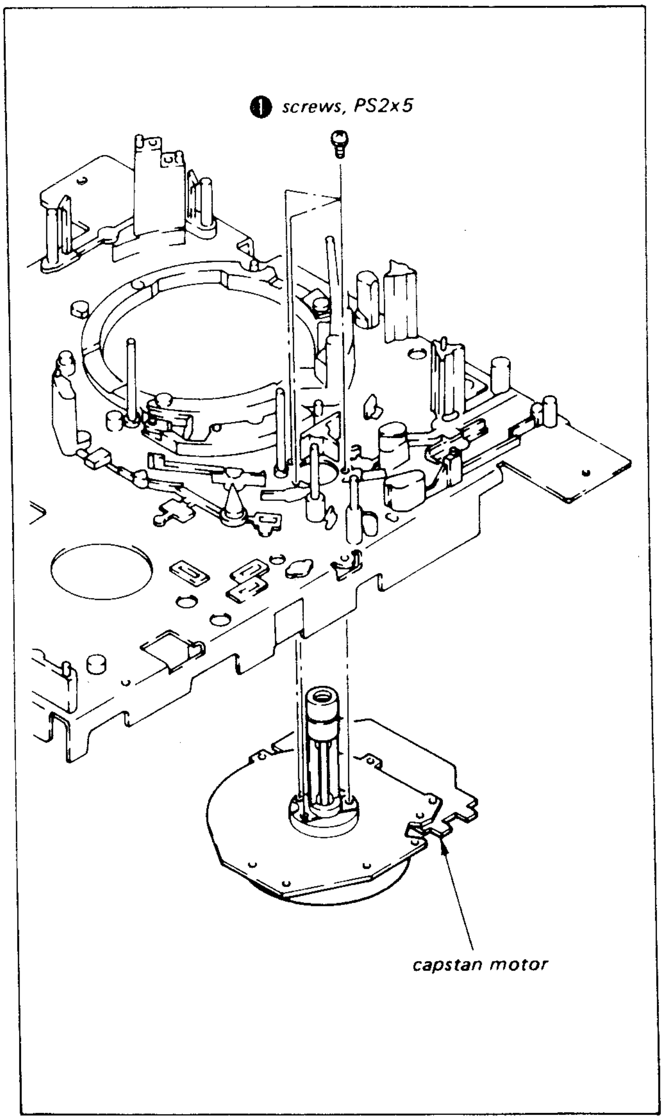

❶ screws, PS2x5
capstan motor

Fig. 3-9 Removal of the capstan motor

3-5. REMOVAL OF THE S COIL SENSOR (Fig. 3-10)

1) Remove the spring ❶.
2) Remove the claw ❷ in the direction of arrow Ⓐ, then pull the S coil sensor ❸ out.
3) Pull out the connector ❹ from CN5 on SA-13 board.

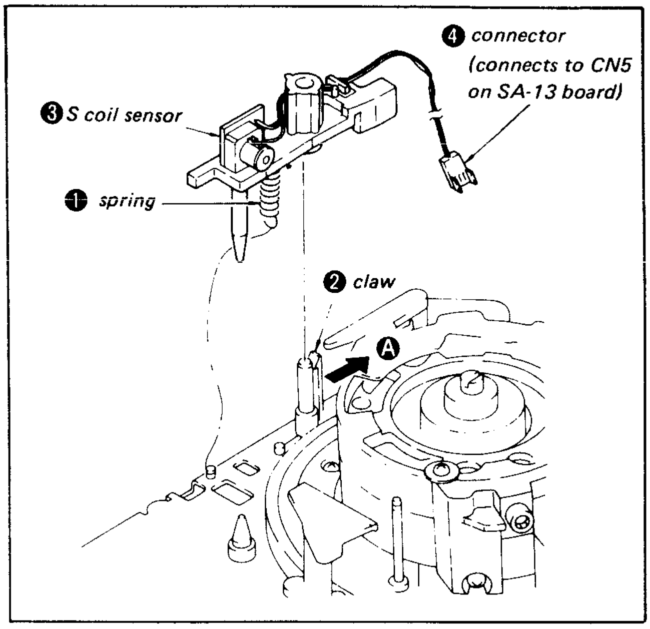

❹ connector
(connects to CN5
on SA-13 board)
❸ S coil sensor
❶ spring
❷ claw
Ⓐ

Fig. 3-10. Removal of the S coil sensor

3-6. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY (Fig. 3-11)

1) Refer to the "REMOVAL OF THE VT-1 BOARD" then remove the VT-1 board.
2) Remove the screw ❶ then remove the retainer upper case ❷.
3) Remove the three screws ❸.
4) Remove two claws ❹ then remove the planet gear holder ❺.
5) Remove the timing belt (loading belt) ❻ from the internal gear ❾.
6) Pull out the connector CN-9 (BLK) ❼ from the SA-13 board.
7) Remove the FL cassette compartment assembly ❽ in the direction shown by the arrow.

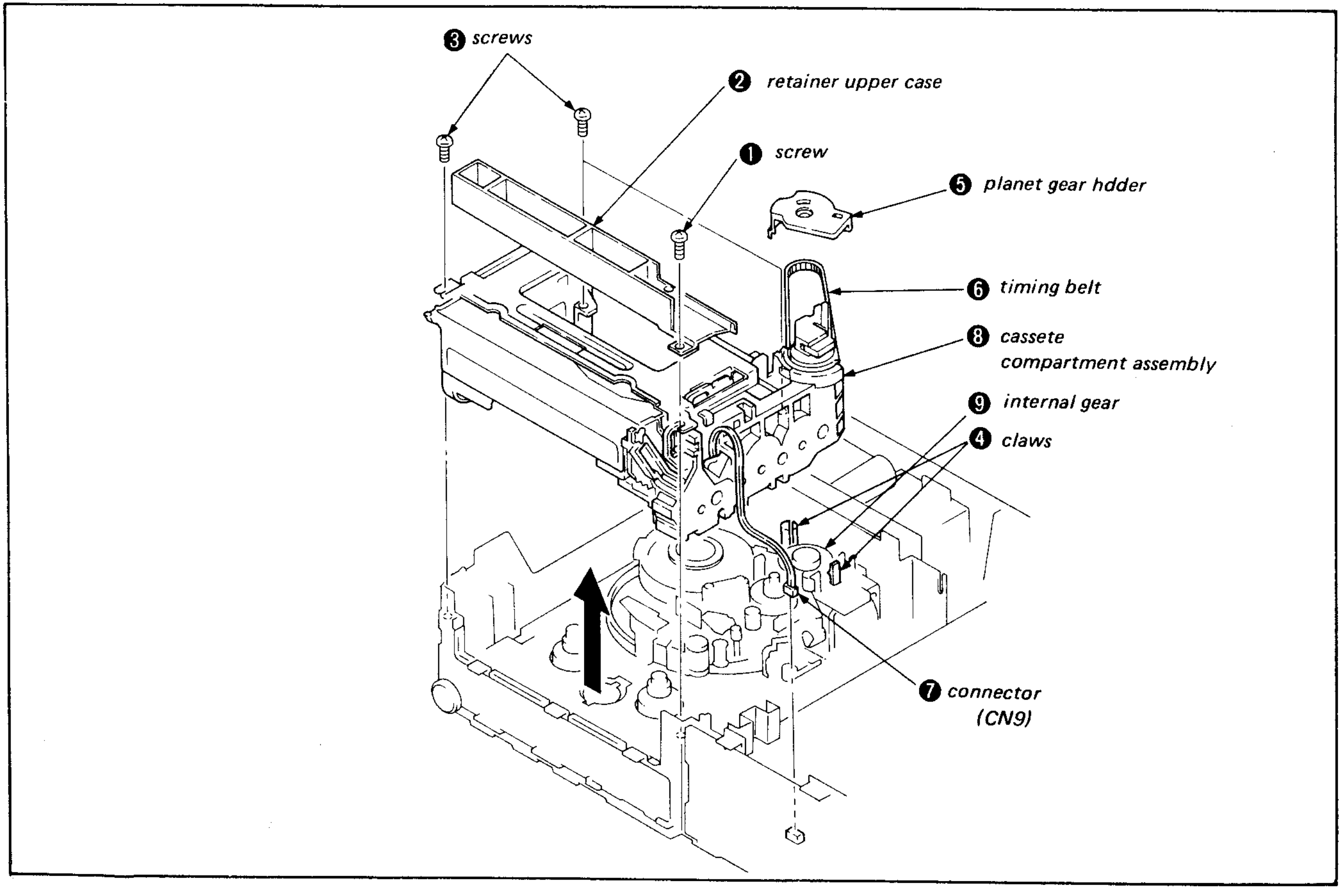

❸ screws
❷ retainer upper case
❶ screw
❺ planet gear hdder
❻ timing belt
❽ cassete
compartment assembly
❾ internal gear
❹ claws
❼ connector
(CN9)

Fig. 3-11. Removal of the FL cassette compartment assembly

3-7. ADJUSTMENT OF THE FL CASSETTE COMPARTMENT

3-7-1. Adjustment of the Position of the Right Gear of the FL Cassette Compartment Assembly

In the FL cassette compartment assembly, the cassette holder must always move parallel to the mechanical chassis. The gear system is used to control the amount by which the cassette holder advances so that this will be the case. Consequently, if the gears in this section slip out of mesh, the next time the unit is assembled the gear mesh must be adjusted to the correct position; otherwise the cassette will not feed properly.

[Adjustment of the gear positions]

1) Get a positioning rod ❶ about 200 mm long and 3 mm in diameter ready.
2) While passing the positioning rod through the combination of the drive arm right ❷ and cassette ON cam, fit the latter on the right side plate. Similarly, fit the drive arm left onto the left side plate.
3) Similarly, hile passing the positioning rod through the worm wheel ❸ fit the latter onto the right side plate.
4) Similarly, while passing the positioning rod through the combination of the limiter gear ❹ and cassette OFF cam, fit the latter onto the right side plate.

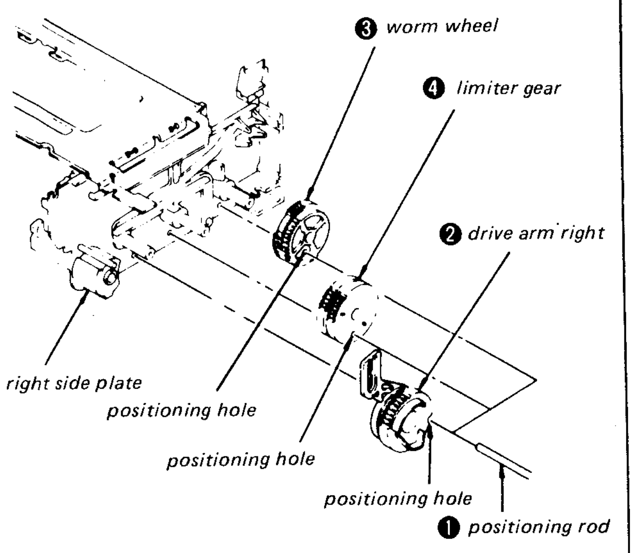

❸ worm wheel
❹ limiter gear
❷ drive arm right
right side plate
positioning hole
positioning hole
positioning hole
❶ positioning rod

Fig. 3-12. Positioning of the FL cassette compartment gears

3-7-2. Cassette ON Switch Operation Check and Adjustment

[Method of checking]

When inserting a cassette into the FL cassette compartment assembly, confirm that, as the cassette is inserted, the leaf-switch comes ON when the center of the drive roller is 8 to 13 mm from the end of the guide groove, as shwon in Fig. 3-13.

[Method of adjustment]

Bend the tip of the cassette ON switch in the direction of the arrow.

Adjust so that the cassette ON switch comes ON when the above distance is 8 to 13 mm, and finally tighten the screw.

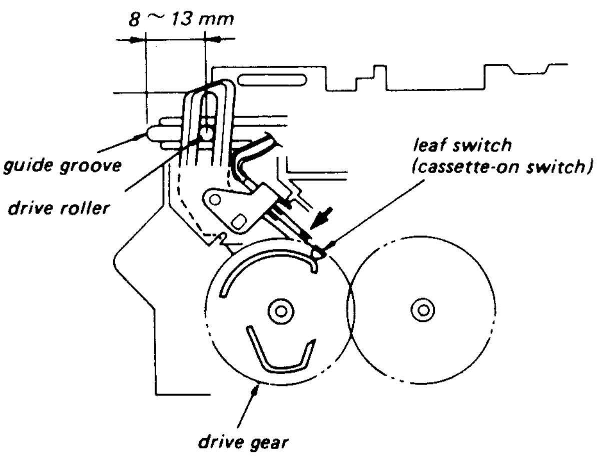

8 ~ 13 mm
guide groove
drive roller
leaf switch
(cassette-on switch)
drive gear

Fig. 3-13. Cassette ON switch operation check and adjustment

3-7-3. Checking and Adjustment of the Cassette Door Assembly

[Method of checking]

With the door opening and closing arm returned all the way in the direction of arrow Ⓐ. check to make sure that the upper and lower doors are vertical.

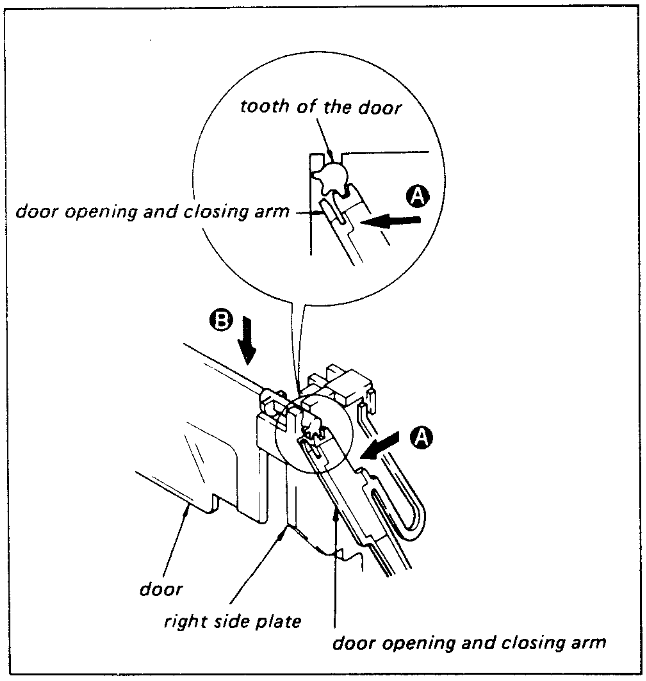

tooth of the door
door opening and closing arm
Ⓐ
Ⓑ
Ⓐ
door
right side plate
door opening and closing arm

Fig. 3-14. Adjustment of the position of the cassette door assembly

[Method of adjustment]

check to make sure that the door opening and closing rack plate has returned all the way. Then. close the upper door together in the drection of arrow Ⓑ so that it is vertical. and mesh the gears.

3-7-4. Mounting the FL Cassette Compartment Assembly (Fig. 3-15)

1) Hook the two holes ❶ of the FL cassette compartment assembly onto the mechanical chassis, then place the compartment in the specified position on the chassis.
2) Loosely tighten the three mounting screws ❷ of the FL cassette compartment assembly.
3) Attach the retainer upper case ❸ to the specified position on the FL cassette compartment assembly and secure it with screw ❹ temporarily.
4) Move the FL cassette compartment assembly forward and backward with respect to the mechanical chassis, set it in the correct position, then tighten the mounting screws ❷ all the way.
5) Connect the timing belt (loading belt) ❺ between the loading motor and the worm gear, then hold it in place with the planet gear holder ❻.
6) Insert the harness sticking ❼ out from the FL cassette compartments into connector ❼ CN9 on SA-13 board.

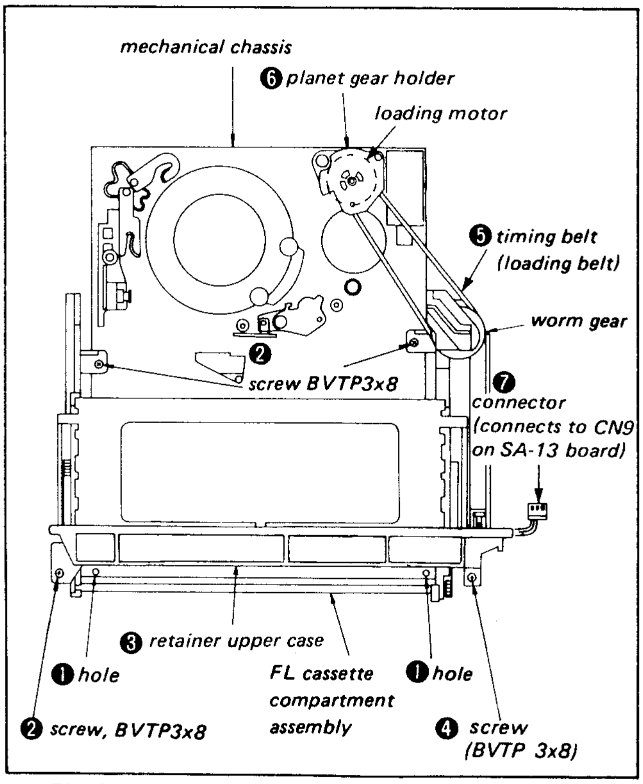
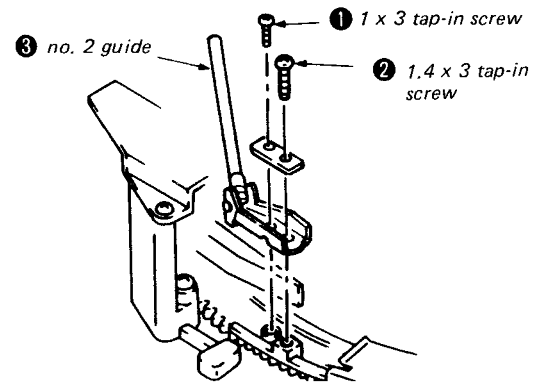

mechanical chassis
❻ planet gear holder
loading motor
❺ timing belt (loading belt)
worm gear
❷ screw BVTP3x8
❼ connector (connects to CN9 on SA-13 board)
❸ retainer upper case
❶ hole
FL cassette compartment assembly
❶ hole
❷ screw, BVTP3x8
❹ screw (BVTP 3x8)

Fig. 3-15. Mounting the FL cassette compartment assembly

3-8. REMOVAL OF THE No. 2 AND No. 3 GUIDES

3-8-1. Removal of the No. 2 Guide

1) Remove the 1 x 3 tap-in screw ❶ .
2) Remove the 1.4 x 3 tap-in screw ❷ .
3) Remove the No. 2 guide assembly ❸ .


❶ 1 x 3 tap-in screw
❸ no. 2 guide
❷ 1.4 x 3 tap-in screw

<To remount>

1) Loosely tighten the 1 x 3 tap-in screw.
2) Tighten the 1.4 x 3 tap-in screw all the way.
3) Adjust the 1 x 3 tap-in screw until the height is 35 mm. After adjustment, lock the screw.
Note: The no. 2 guide is up all the way.

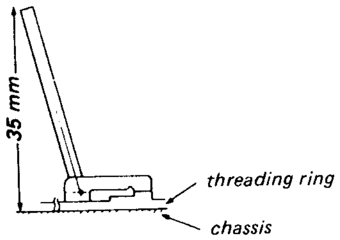
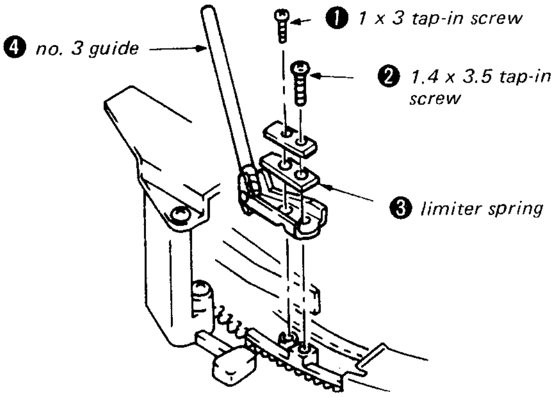

35 mm
threading ring
chassis

Fig. 3-16. Removal of the no. 2 guide

3-8-2. Removal of the No. 3 Guide

1) Remove the 1 x 3 tap-in screw ❶ .
2) Remove the 1.4 x 3.5 tap-in screw ❷ .
3) Remove the limiter spring ❸ .
4) Remove the No. 3 guide assembly ❹ .


❶ 1 x 3 tap-in screw
❹ no. 3 guide
❷ 1.4 x 3.5 tap-in screw
❸ limiter spring

<To remount>

1) Loosely tighten the 1 x 3 tap-in screw.
2) Tighten the 1.4 x 3.5 tap-in screw all the way.
3) Adjust the 1 x 3 tap-in screw so that the height is 30 mm. After adjustment, lock the screw.
Note: The no. 3 guide is up all way.

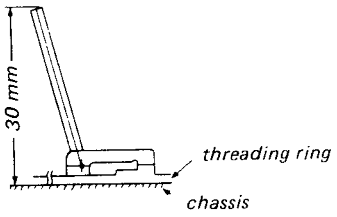

30 mm
threading ring
chassis

Fig. 3-17. Removal of the no. 3 guide

3-9. REPLACEMENT AND ADJUSTMENT OF THE S THREADING RING

3-9-1. Perparation to Remove the S Therading Ring Removal of the ACE Assembly, FE Head and Threading Motor (Fig. 3-18)

1) Remove the cross-recessed head screw ❶.
2) Remove the No. 6 guide nut ❷.
3) Remove the No. 6 guide washer ❸.
4) Remove the No. 6 guide spacer ❹.
5) Remove the compression coil spring ❺.
6) Remove the 2 guide adjustment screw ❻, then remove the ACE assembly and the FE head.

Note:
Since the ACE assembly and the FE head are connected by a lead wire, be careful when removing them.

7) Remove the 2 screws ❼, then remove the threading motor assembly by pulling it up and out.

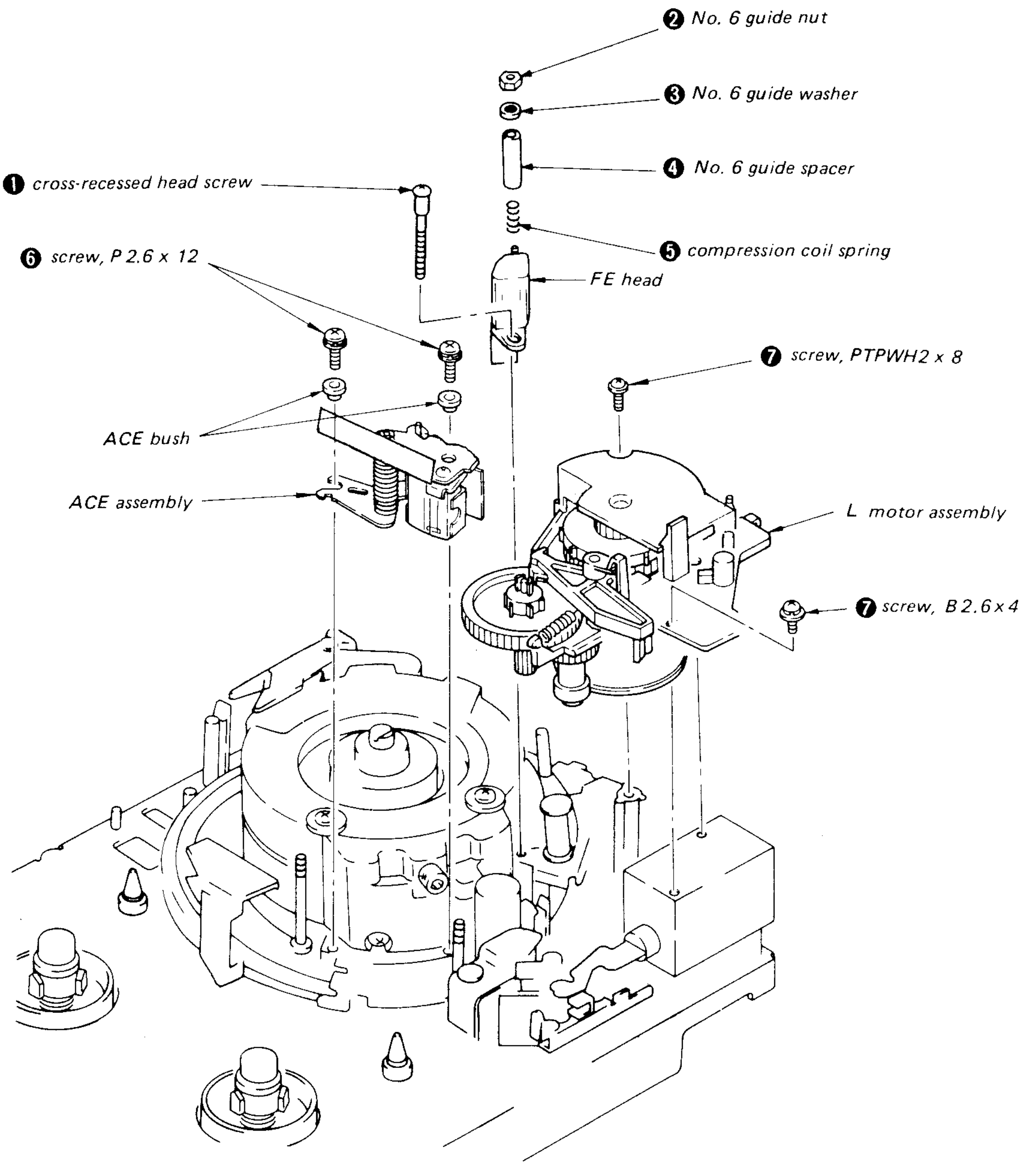

❷ No. 6 guide nut
❸ No. 6 guide washer
❹ No. 6 guide spacer
❶ cross-recessed head screw
❺ compression coil spring
❻ screw, P 2.6 x 12
FE head
❼ screw, PTPWH2 x 8
ACE bush
ACE assembly
L motor assembly
❼ screw, B 2.6x4

Fig. 3-18. Removal of the ACE assembly, FE head and TE motor assembly

3-9-2. Removal of Miscellaneous Parts (Fig. 3-19)

Proceeding in the same manner as in replacement of the drum assembly, measure the width of the gap between the upper drum and the adjusting plates (Fig. 3-5).

1) Remove the screw ❶ , then remove the tape guide ground plate and adjusting plates 2 and 3 ❷ .
2) Remove the two screws ❸ , then remove the tape holder assembly ❹ .
3) Remove the screw ❺ , then remove the guide plate ❻.
4) Remove the two screws (PTPWH2 x 8) ❼ and the screw (2.6 x 24) ❽ , then remove shuttle guide 2 ❾ .
5) Remove the two screws (PTPWH2 x 8) ❿ and the screw (2.6 x 24) ⓫ . Then remove the two claws holding shuttle guide 1-YA ⓬ in place, and finally rmove shuttle guide 1-YA ⓬ .
6) Remove the slant base assembly ⓭ .
7) Remove the pin link liner plate.

Note:

After removing the guide plate, do not thread or unthread a tape with the shuttle guide mounted.

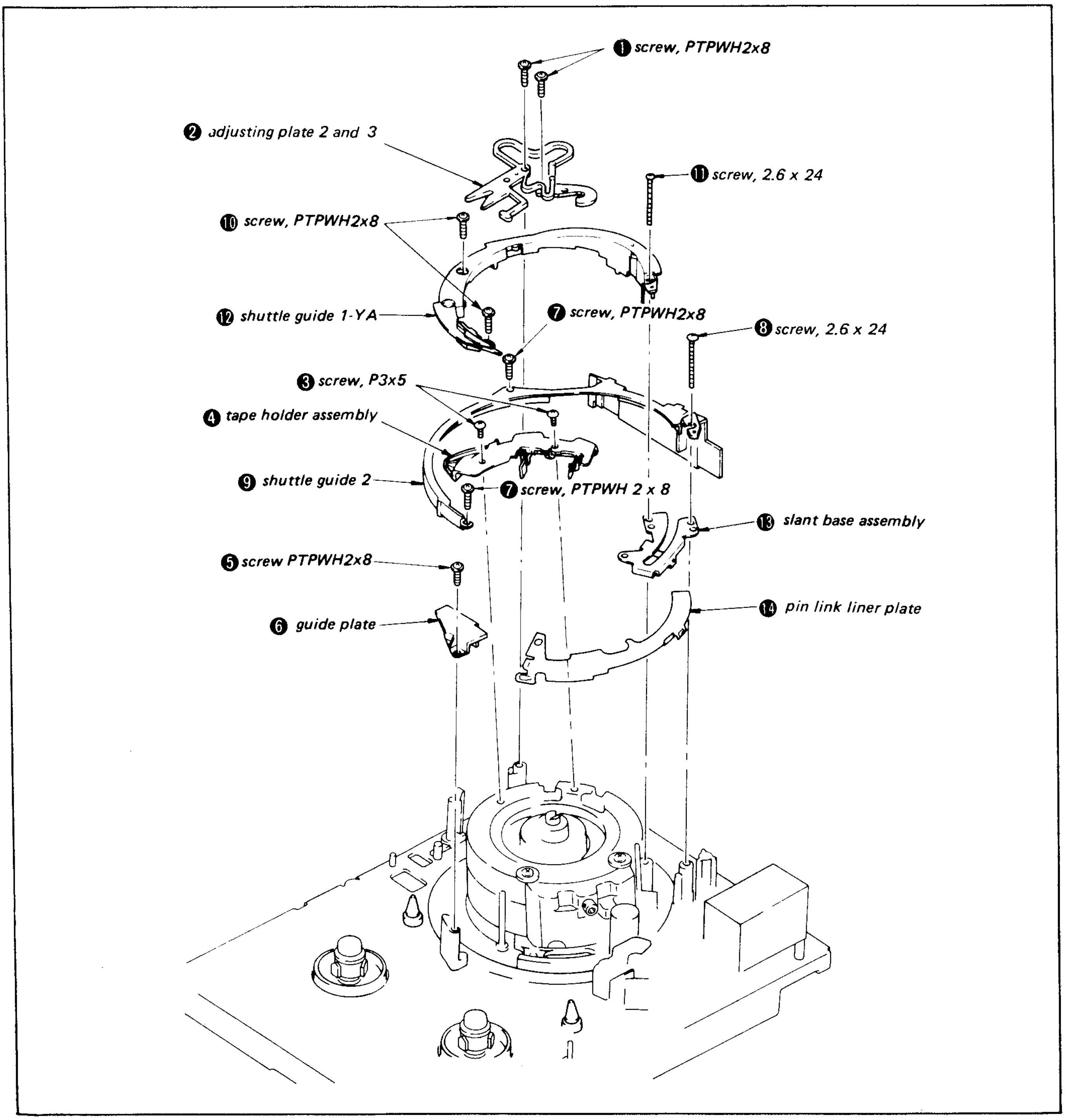

❶ screw, PTPWH2x8
❷ adjusting plate 2 and 3
⓫ screw, 2.6 x 24
❿ screw, PTPWH2x8
⓬ shuttle guide 1-YA
❼ screw, PTPWH2x8
❽ screw, 2.6 x 24
❸ screw, P3x5
❹ tape holder assembly
❾ shuttle guide 2
❼ screw, PTPWH 2 x 8
⓭ slant base assembly
❺ screw PTPWH2x8
⓮ pin link liner plate
❻ guide plate

Fig. 3-19. Removal of miscellaneous parts

3-9-3. Removal of the S Threading Ring (Fig. 3-20)

1) Turn the stop washer ❶ and remove the ring roller (B) ❷ and ring roller ❸
2) Remove the S threading ring ❹.

Note:
Once a stop washer has been removed, do not use it again.

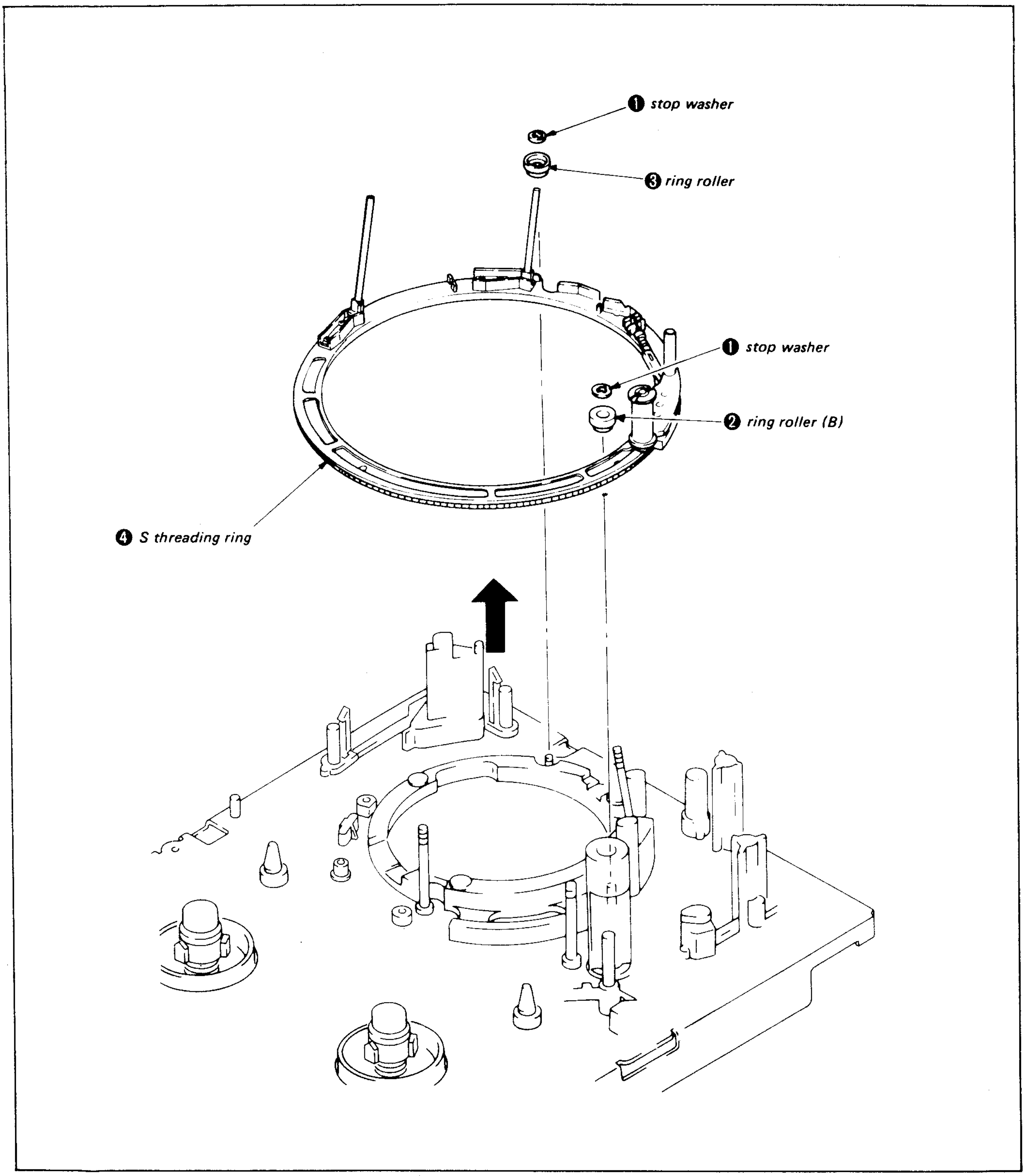

❶ stop washer
❸ ring roller
❶ stop washer
❷ ring roller (B)
❹ S threading ring

Fig. 3-20. Removal of the S threading ring

3-9-4. S Threading Ring Mounting and Position Adjustment (Fig. 3-21)

1) Set the slider gear assembly ❶ in the unthreading completed position.
   (Slider gear assembly ❶ set so that it is up against part T slider stop mold ❷ .)
2) In this condition, fit the S threading ring ❸ into place, match the chassis hole (3ϕ) ❹ of part Ⓐ with the S threading ring hole (1.5ϕ) ❺ and mesh with the drive gear assembly ❻ teeth.
3) Attach ring roller (B) ❼ and fix in place with a stop washer ❽ .

   Note:
   After replacement and mounting are completed, adjust the ACE assembly as explained in the section on tape path adjustment.

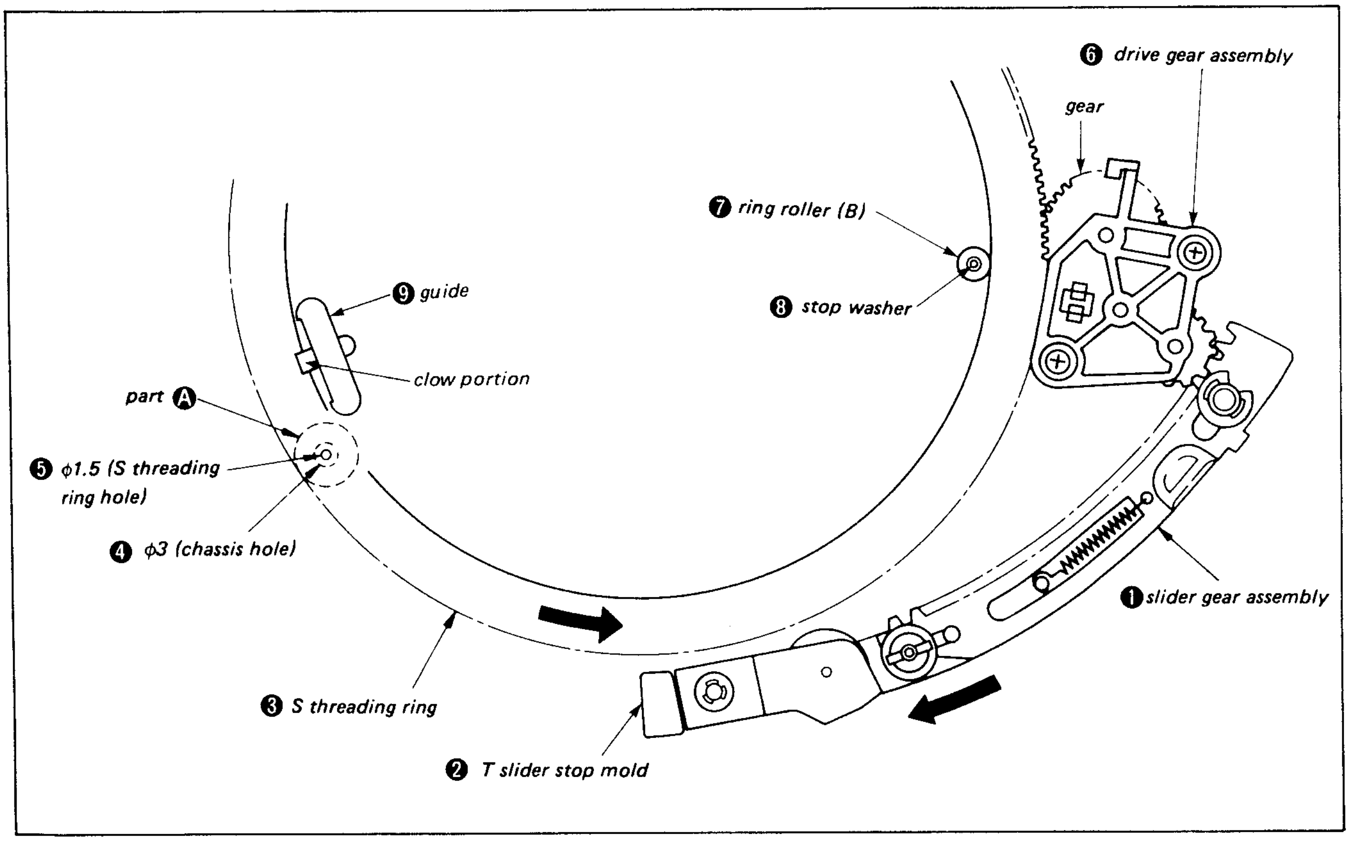

❻ drive gear assembly
gear
❼ ring roller (B)
❽ stop washer
❾ guide
clow portion
part Ⓐ
❺ ϕ1.5 (S threading ring hole)
❹ ϕ3 (chassis hole)
❶ slider gear assembly
❸ S threading ring
❷ T slider stop mold

Fig. 3-21. S threading ring position adjustment

3-10. PINCH SNAP-FIT LIMITER GAP CHECK AND ADJUSTMENT

[Method of checking]

1) Set in the threading completed condition.
2) With the plunger pushed in all the way, confirm that the thickness of the pinch snap-fit limiter gap is 0.4 mm to 0.6 mm. If it is not, adjust as explained under [method of adjustment] below.

[Method of adjustment]

1) With the pinch solenoid in the abforbed condition (when the plunger is pushed in all the way), loosen the adjustment screw ❶.
2) Press the pinch limiter adjustment plate ❸ in the direction of arrow ⓐ a with an ordinary screwdriver ❷, as in section Ⓐ in the diagram, and adjust until the thickness of the gap in 0.4 mm to 0.6 mm.
   Tighten the adjustment screw and then lock it to fix everthing in place.

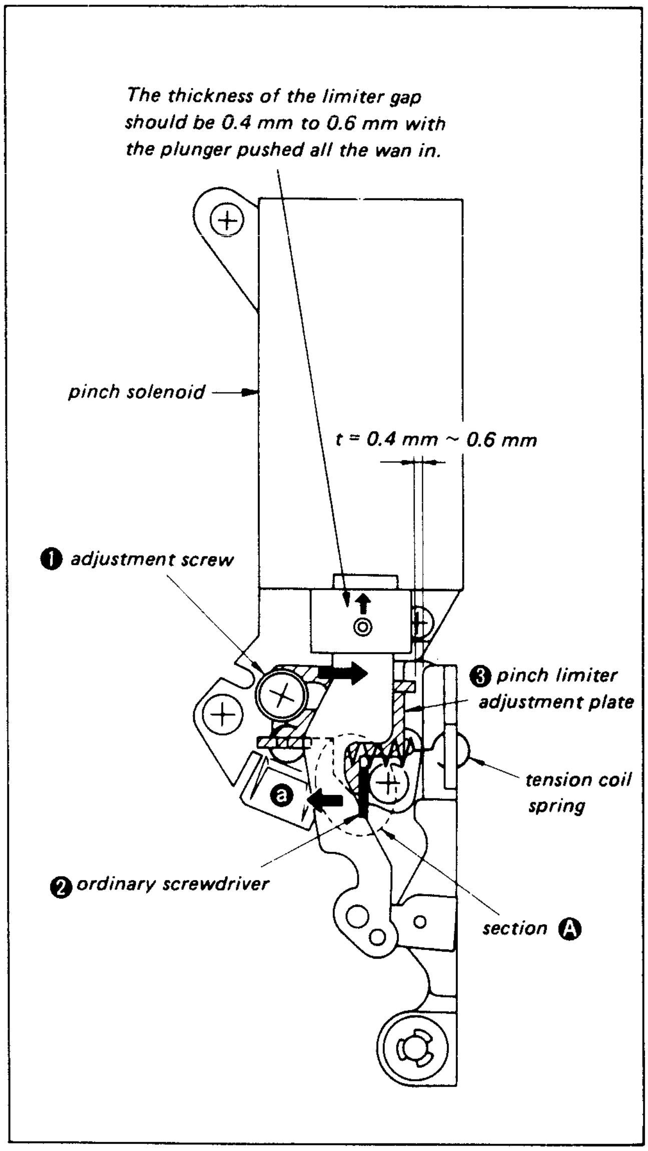

The thickness of the limiter gap should be 0.4 mm to 0.6 mm with the plunger pushed all the wan in.
pinch solenoid
t = 0.4 mm ~ 0.6 mm
❶ adjustment screw
❸ pinch limiter adjustment plate
ⓐ
tension coil spring
❷ ordinary screwdriver
section Ⓐ

Fig. 3-22. Pinch snap-fit limiter gap adjustment plate

3-11. THREADING END SWITCH AND T COIL SENSOR

3-11-1. Threading End Switch (TE Switch) Position Check and Adjustment

[Method of checking]

Turn the S threading ring manually. Check to make sure that, when the lock roller moves from above the straight line part of the notch in the ring (Fig. 3-23 section Ⓐ) to 1/3 of the way down it and back, the TE switch turns ON and OFF.

If the lock roller has to move outside of this range before the switch will turn ON and OFF, adjust as explained below.

[Method of adjustment]

1) Set the lock roller between the top of the notch in the S threading ring and 1/3 of the way down it turn the TE switch in the direction of the arrow and, when the switch turns ON, fix the TE switch in place.
2) When the adjustment is completed, repeat the check as described above [method of checking].

[Removal]

1) Remove the tension coil spring that is attached to the S coil sensor assembly, then remove the S coil sensor.
2) Remove the lock arm assembly in the direction of arrow Ⓐ.

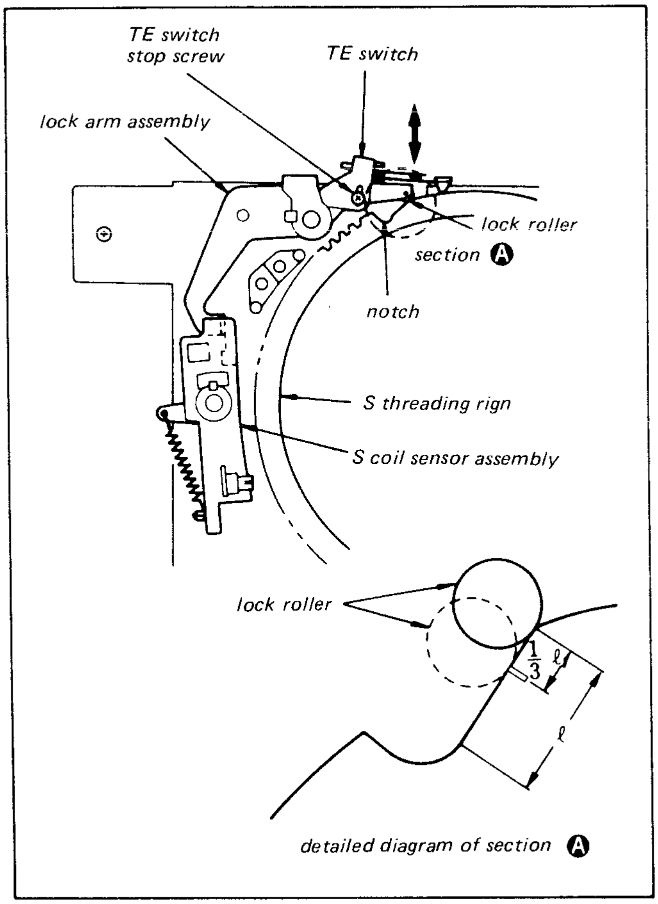

TE switch stop screw
TE switch
lock arm assembly
lock roller
section Ⓐ
notch
S threading rign
S coil sensor assembly
lock roller
$\frac{1}{3}\ell$
ℓ
detailed diagram of section Ⓐ

Fig. 3-23. TE switch position adjustment

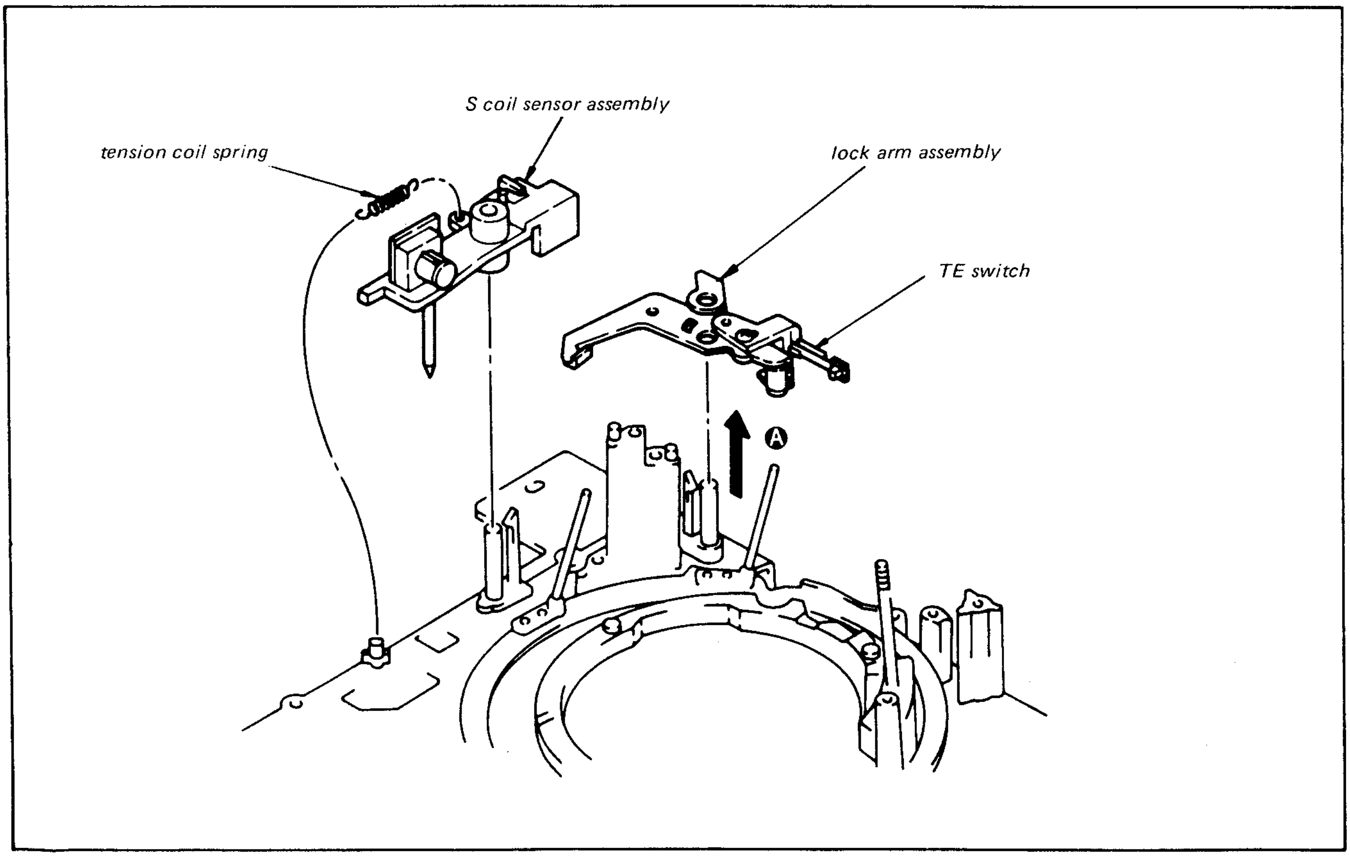

S coil sensor assembly
tension coil spring
lock arm assembly
TE switch
Ⓐ

Fig. 3-24. Removal of the TE switch assembly and lock arm assembly

3-11-2. T Coil Sensor Mounting and Operation Check

[Method of checking]

Confirm that T coil sensor link ❷ is pressed and T coil sensor ❸ moves in the direction of arrow Ⓑ when the T slider gear assembly ❶ is moved in the direction of arrow Ⓐ .

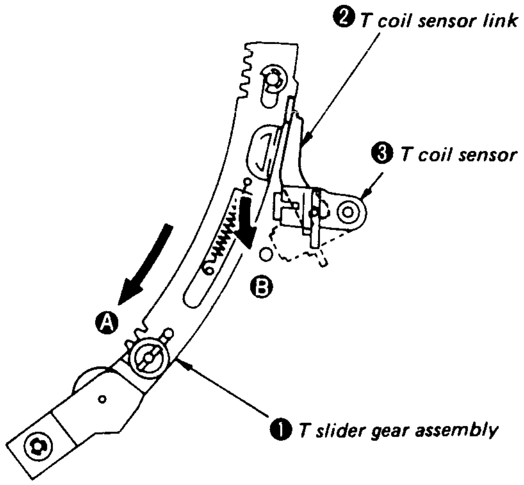

❷ T coil sensor link
❸ T coil sensor
Ⓐ
Ⓑ
❶ T slider gear assembly

Fig. 3-25. T coil sensor operation check.

[Method of mounting]

1) Place T coil sensor link ❶ in the prescribed position.
2) Match up the T coil sensor ❷ hole with the chassis shaft ❸ and insert. Place so that it engages with T coil sensor link ❶ .
3) Hook the tension coil spring ❹ on the T coil sensor and chassis claw.

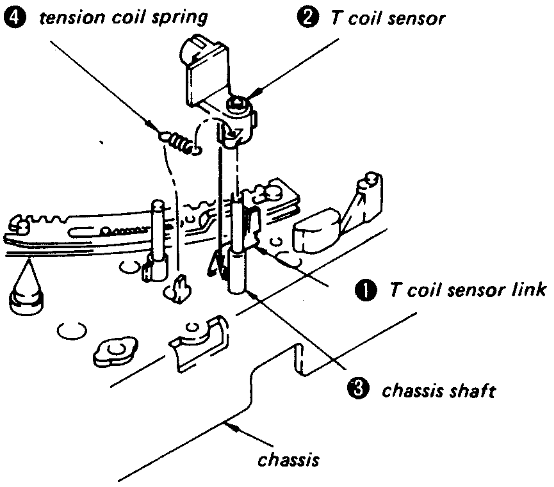

❹ tension coil spring
❷ T coil sensor
❶ T coil sensor link
❸ chassis shaft
chassis

Fig. 3-26. T coil sensor link and T coil sensor mounting.

3-12. REMOVAL AND ADJUSTMENT OF THE REEL BLOCK ASSEMBLY

3-12-1. Removal of the Reel Block Assembly

1) Place the set upside down.
2) Remove the four screws ❶.
3) Remove the reel block assembly ❷ in the direction shown by the arrow.

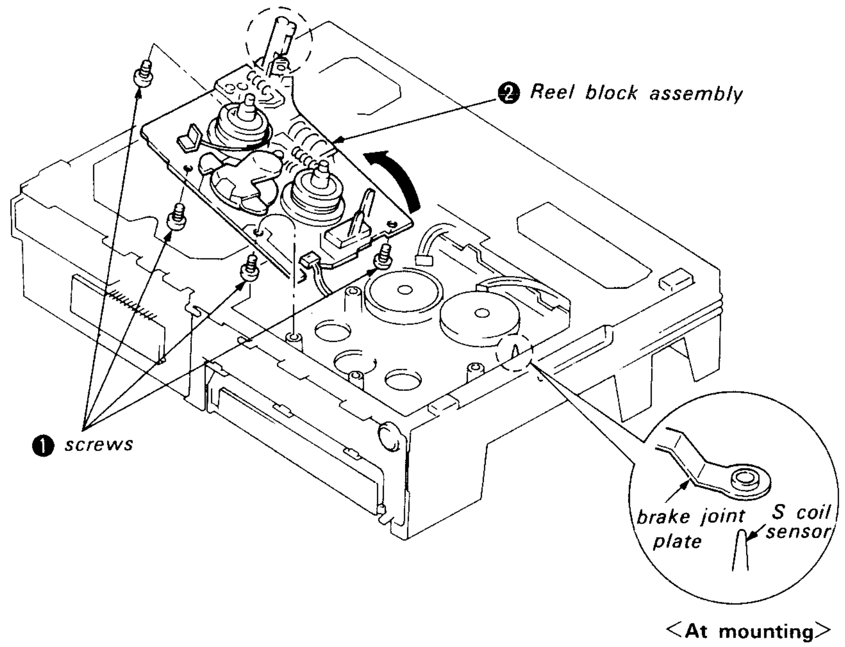

❷ Reel block assembly
❶ screws
brake joint plate
S coil sensor
<At mounting>

Fig. 3-27 Removal of the reel block assembly

3-12-2. Adjustment of the Position of the Tension Regulating Lever

[Method of adjustment]

1) Loosen the adjustment screw ❶.
2) Adjust by moving the tension regulating band assembly in the direction of arrow Ⓐ so that the point Ⓑ of the function lever coincides with the left edge of the hole ❷ in a straight line.
3) After adjustment, tighten the adjustment screw, being careful that the tension regulating band assembly does not move.

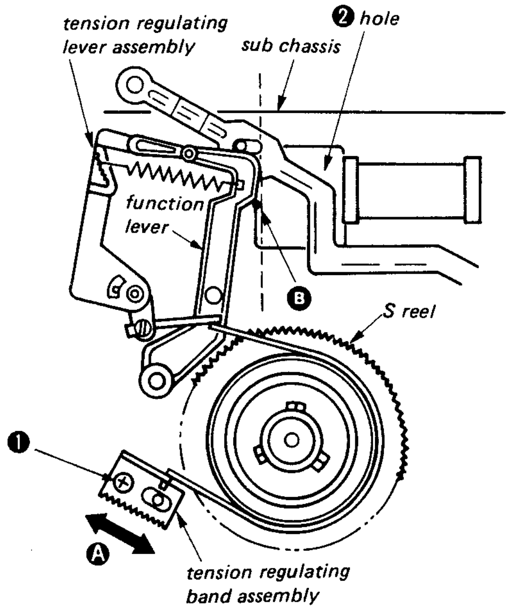

tension regulating lever assembly
❷ hole
sub chassis
function lever
Ⓑ
S reel
❶
Ⓐ
tension regulating band assembly

Fig. 3-28 Adjustment of the position of the tension regulating lever

3-13. ADJUSTMENT OF THE FORWARD BACK TENSION

[Method of measurement]

1) Insert the torque cassette (SL-0003C) and put the unit in playback mode.
2) Read the value on the meter on the S reel side after the needle has gone around about once.
The correct value is 35g•cm ± 3g•cm

Notes:

i) **The set must be perfectly level during this measurement.**
ii) **After the measurement, the tape can become slack when the stop button is pressed. If this happens set the unit is forward mode to take up the slack before removing the tape.**

[Method of adjustment]

Move the position of the tension coil spring that is hooked on the tension regulating lever assembly in the direction of arrow Ⓐ until the measured value falls within the correct range.

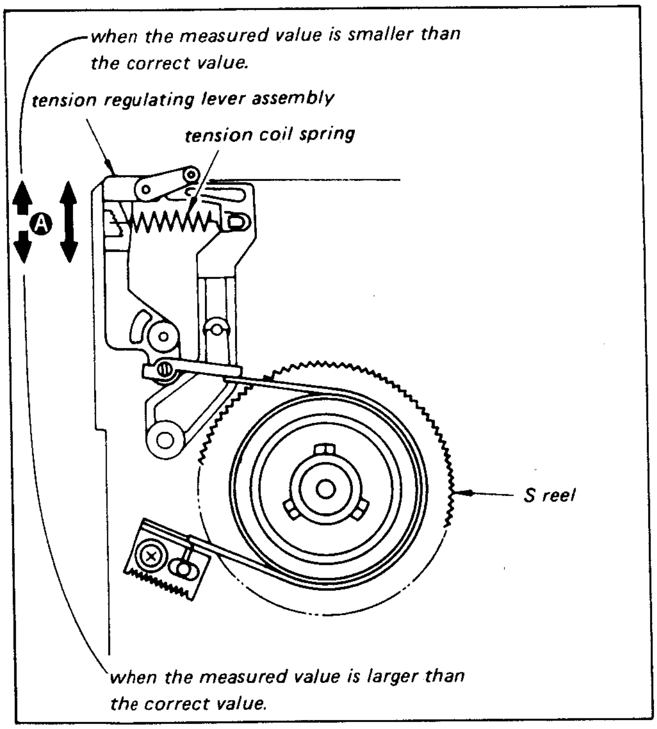

when the measured value is smaller than the correct value.
tension regulating lever assembly
tension coil spring
A
S reel
when the measured value is larger than the correct value.

Fig. 3-29 Adjustment of the back tension

3-14. ADJUSTMENT OF THE FORWARD TORQUE

[Method of measurement]

1) Insert the torque cassette (SL-0003C) and start to record a telecast.
2) Read the value on the meter on the T reel side after the needle has gone around about once. The correct range is 80 g-cm ±5 g-cm.

[Method of adjustment]

1) Remove the front panel.
2) Turn potentionmeter RV306 on SA-13 board to adjust the torque until its value falls within the correct range.

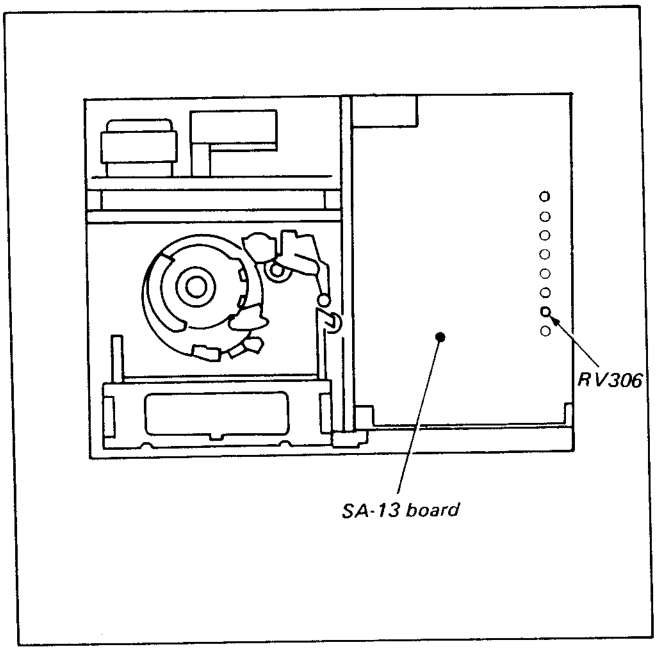

RV306
SA-13 board

Fig. 3-30. Adjustment of the forward torque

Note:

When the forward torque is weakened during the measurement the tape can become slack, in which case the set will go into emergency stop mode. In such a case, the only switches that will work are the cassette eject switch and the power switch. It is necessary to temporarily remove the cassette, or to turn the power OFF and back ON.

4.TAPE PATH ADJUSTMENT

4-1. TRACKING ADJUSTMENT

This adjustment has a large effect on the picture quality in each mode and on the interchangeability of tapes, so it should be done carefully.

4-1-1. Preparation for adjustment
4-1-2. Entrance side Adjustment
4-1-3. Exit side Adjustment

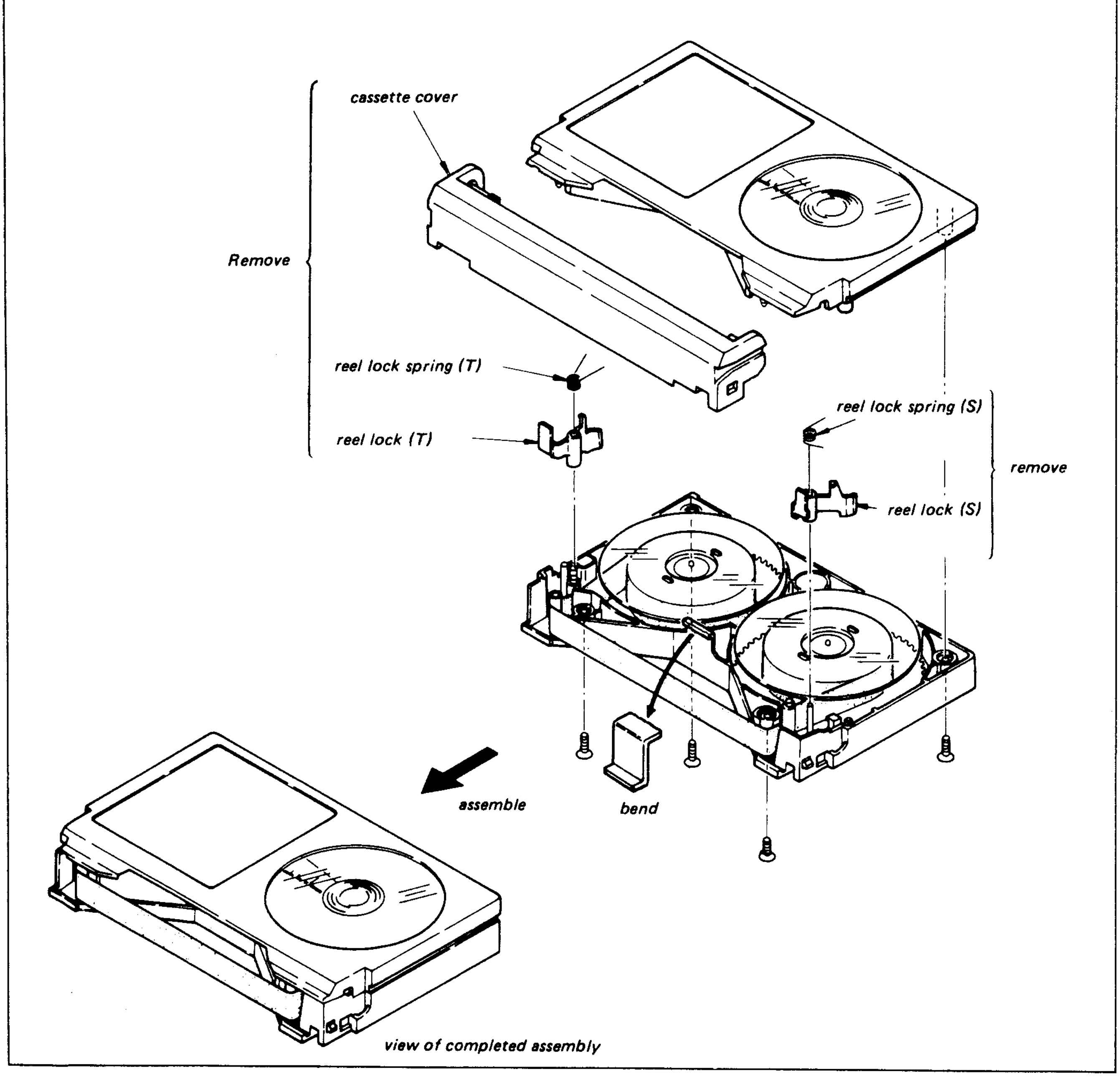
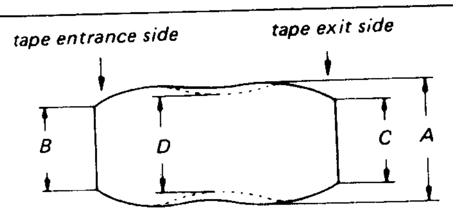

cassette cover
Remove
reel lock spring (T)
reel lock (T)
reel lock spring (S)
remove
reel lock (S)
assemble
bend
view of completed assembly

Fig. 4-1.

4-1-1. Preparation for Adjustment

1) Remove the cassette cover of the alignment tape in accordance with Fig. 4-1.
2) Clean the surface contacted by traveling tape (tape guide, drum tape trailing surface capstan shaft pich roller, ACE FE head surface) will a chamois cloth dipped in methanol.
3) Connect the oscilloscope as follows:
   Channel 1: JW42 or Pin ⑭ of IC5 (VT-1 board)
   Extenal trigger: JW43 or Pin ③ of B2 (VT-1 board)
4) Play back the 1 kHz signal on the traking section of the alignment tape.
5) Confirm that the oscilloscope radio frequency output waveform is flat and that the amplitude is a maximum. (Turn the tracking knob right and left to increase and decrease the amplitude while the waveform remains flat.) When the amplitude of the waveform is a maximum, confirm that the fluctuations and contact of the radio frequency output waveform meet the standards given in Fig. 4-2. If they do not, go through the procedure given in step 6).
6) If the entrance waveform cannot be made flat, as shown in Fig. 4-3 (a), by turning the tracking knob, go through the "entrance side adjustment" described in 4-12, if the exit waveform shown in Fig. 4-3 (b) cannot be made flat, go through the "exit side adjustment" in 4-1-3.



standards: at the maximum of the tracking control knob

contact: $\frac{B}{A} \geqq 0.7$

$\frac{C}{A} \geqq 0.7$

amount of fluctuation: $\frac{D}{A} \geqq 0.9$

Fig. 4-2.

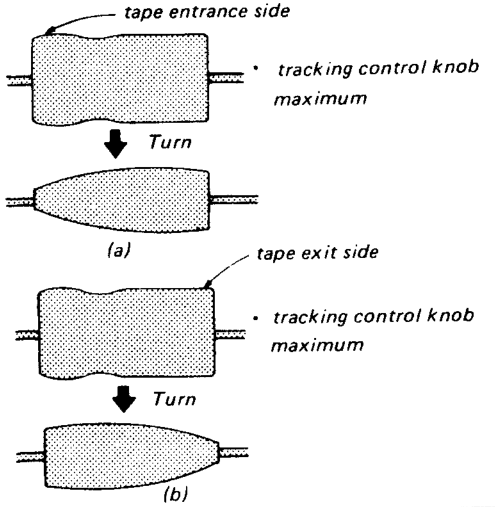

tape entrance side
• tracking control knob maximum
Turn
(a)
tape exit side
• tracking control knob maximum
Turn
(b)

Fig. 4-3.

4-1-2. Entrance Side Adjustment

Whenever the entrance side adjustment is performed, the exit side adjustment must also be performed. The various tape guides and adjustment positions are shown in Fig. 4-5.

1) Turn the No. 6 guide counterclockwise to free the movement of the tape as it enters the drum.
2) Turn the tracking control knob until the amplitude of the waveform is about 60% of its maximum.
3) Loosen No. 5 guide lock screw ❶ and turn the No. 5 guide until the entrance waveform sticks up a little above falt, at shown in the figure below. Then tighten the No. 5 guide lock screw ❶ (Fig. 4-6).

Note:

After tightening No. 5 guide lock screw ❶, confirm that it is as in the figure below.

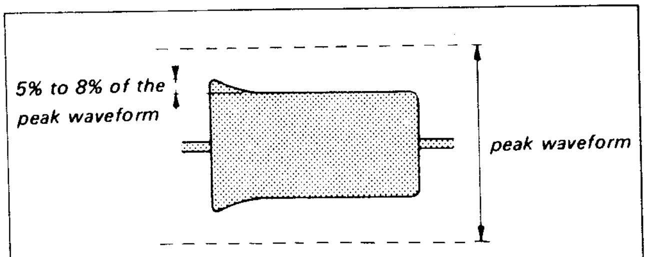


Fig. 4-4.

4) Next, lower the No. 6 guide until the waveform is flat.
5) Press the tape down between the No. 4 and No. 5 guide with a finger to lower the entrance side radio frequency waveform, then let go and confirm that the waveform returns to what it was before.
6) In this condition, check the clearance and curl of the No. 5 guide. If there are clearance and curl, adjust as explained in subsequent sections.

Note:

The tape tension between the No. 3, No. 4 and No. 5 guides must be balanced. If it is not, adjust the tilt of the No. 3 and No. 5 guides.
If the waveform cannot be made to look as shown in Fig. 4-4, or if when the tape is pressed and released on the entrance side it takes time for the waveform to return to what it was before, or if it does not return to what it was before, adjust according to the instructions given below.

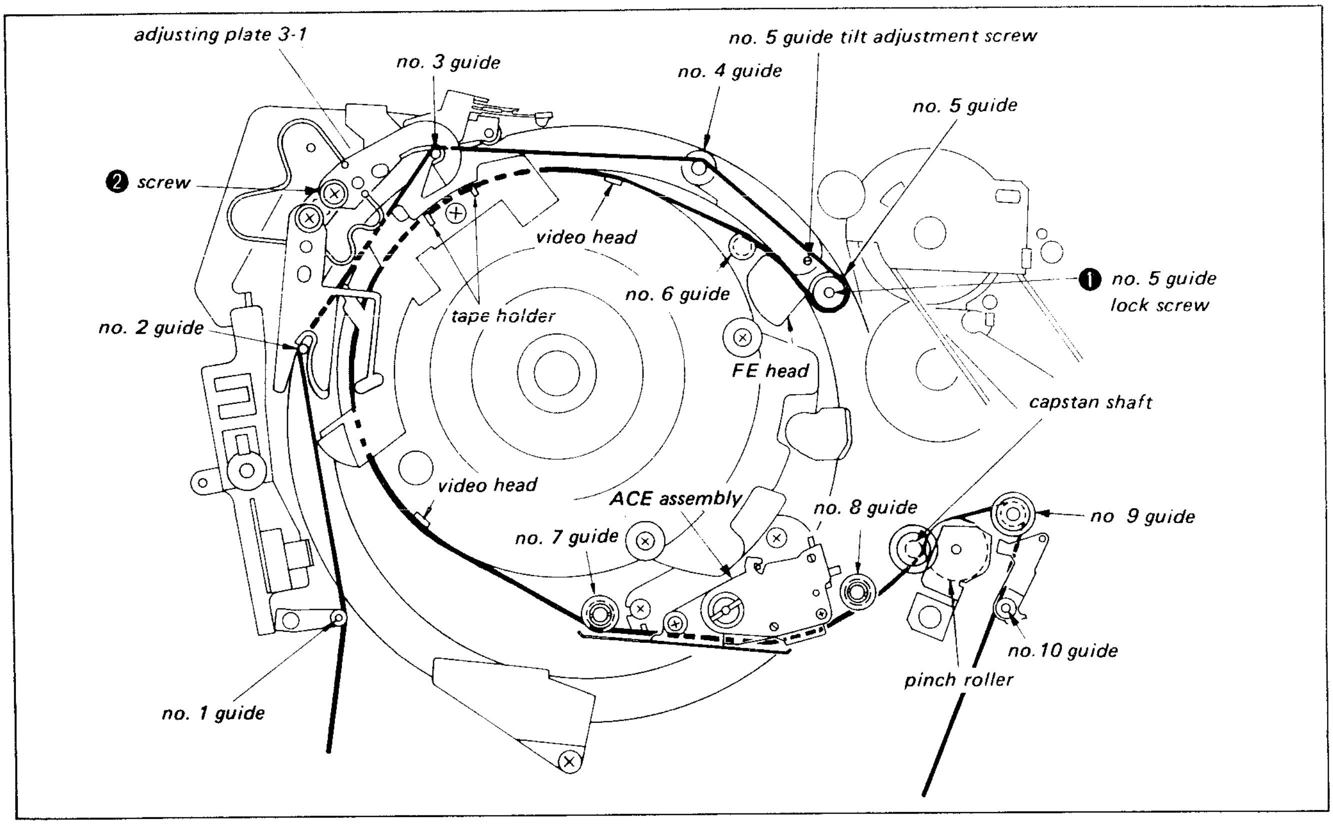

adjusting plate 3-1
no. 3 guide
no. 5 guide tilt adjustment screw
no. 4 guide
no. 5 guide
❷ screw
video head
❶ no. 5 guide lock screw
no. 6 guide
tape holder
no. 2 guide
FE head
capstan shaft
video head
ACE assembly
no. 8 guide
no 9 guide
no. 7 guide
no. 10 guide
pinch roller
no. 1 guide

Fig. 4-5. Tape guide layout diagram

[What to do when the waveform entrance output will not rise]

1) Check to see if the up-down tension between the No. 3, No. 4 and No. 5 guides is uniform. If it is not, adjust the tilt of the No. 3 and No. 5 guides.

   Note:

   The lower flange of the No. 4 guide must not protrude.

2) Raise the lower flange of the No. 4 guide to raise the entrance output.

   Note:

   It is sufficient to raise the lower flange of the No. 4 guide to 0.4 mm from its lowest position (within a rotation angle of 360°).

3) If the operation performed in step 2) fails to raise the waveform output, turn the No. 5 guide tilt adjustment screw slightly to the left, and the entrance output should rise.

[What to do when the waveform entrance output will not drop]

1) Remove the adjusting plate 3-1 of the No. 3 guide from the drum. Just before the lower tension of the tape becomes slack, tighten screw ❷.
2) If the tape is in contact with the lower flange of the No. 4 guide, lower the flange. If the tape is sticking up from the lower flange, adjust the tilt of the No. 5 guide so that the tape does not stick up from the lower flange of the No. 4 guide.

[What to do when there is a clearance in the No. 5 guide]

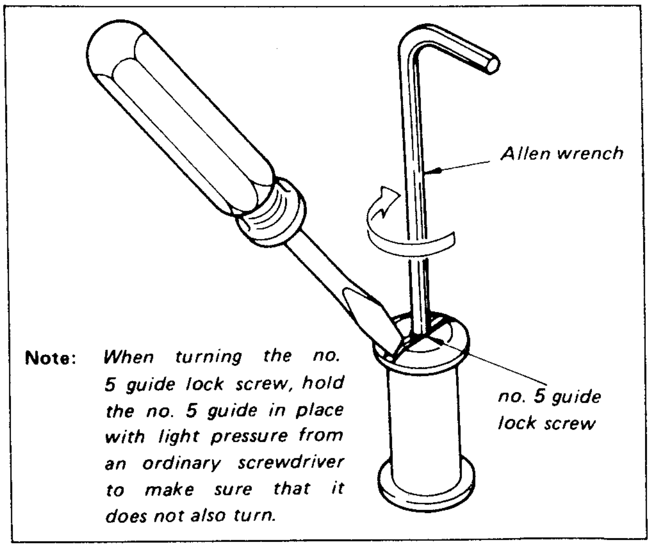
Turn the No. 4 guide counterclockwise to run the tape upward and eliminate the clearance in the No. 5 guide.

Note:

At this time make sure that a large curl is not produced below the No. 4 guide.

[What to do when there is a curl]

1) When there is a gap below the No. 4 guide: Just before the lower tension on the tape becomes slack, move adjusting plate 3-1 of the No. 3 guide to the outside.
2) Whe there is not a gap below the No. 4 guide (when there is a curl below the No. 4 guide):
   i) Check to see if the No. 4 guide has been raised up too high. If it has been raised up too high, turn the adjusting plate clockwise to lower the No. 4 guide.
   ii) If the curl still has not been removed after i), tighten the No. 5 guide tilt adjustment screw in the clockwise direction until the curl is removed.


Allen wrench
no. 5 guide lock screw

Note: *When turning the no. 5 guide lock screw, hold the no. 5 guide in place with light pressure from an ordinary screwdriver to make sure that it does not also turn.*

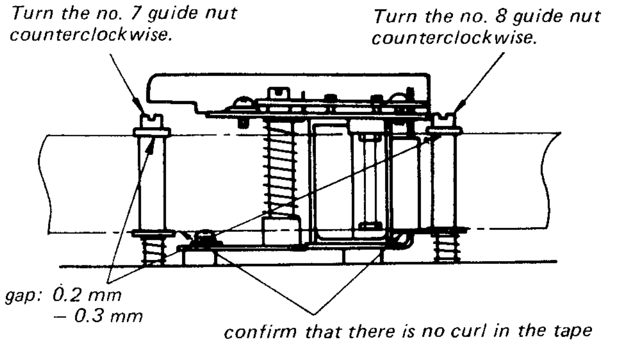
Fig. 4-6.

4-1-3. Exit Side Adjustment

1) Connect the oscilloscope to JW42 or Pin ⑭ of IC5 (VT-1 board). Connect the external trigger to JW43 or Pin ③ of B2 (VT-1 board).
2) Play the tracking section of the alignment tape. Adjust the tracking knob to reduce the amplitude of the radio frequency output waveform to 60% of its maximum level.
3) Watch the radio frequency output wavefrom when the No. 7 and No. 8 guides are raised (by turning the respective guide nuts counterclockwise) to let the tape run free. This waveform is called to exit free waveform.

Note:

Be careful not to raise the guides too far. They should be raised only about 0.2 to 0.3 mm, and the tape should not contact the lower flange of the AEC head.



Turn the no. 7 guide nut counterclockwise.

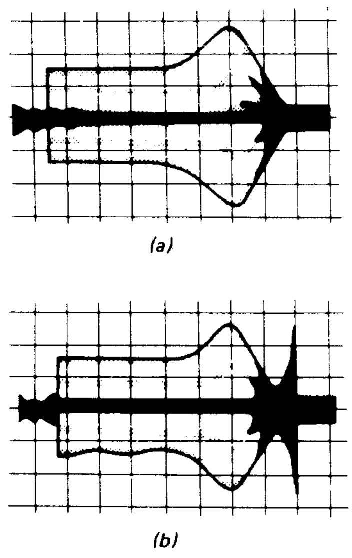
Turn the no. 8 guide nut counterclockwise.

gap: 0.2 mm – 0.3 mm

confirm that there is no curl in the tape

Fig. 4-7.

4) At this time, confirm that the exit free waveform is within the range shown in Fig. 4-8 (a) and (b).
   - If it is outside of this range, adjust according to the procedure in 4-3.



(a)

(b)

Fig. 4-8.

5) Turn the No. 7 guide nut clockwise until the waveform is flat.
6) Turn the No. 8 guide nut clockwise until the No. 8 guide is lined up with the tape (just before the waveform starts to change lower the guide until there is no curl).
7) During playback, confirm that no curl occurs in the No. 7 guide or the No. 8 guide.
8) During rewind, confirm that no curl or clearance occurs in the No. 8 guide. If there is curl or clearance, adjust using the No. 9 guide. After adjustment, lock the guide nut.

4-2. ADJUSTMENTS AFTER REPLACEMENT OF THE ACE ASSEMBLY

After removal or replacement of the ACE assembly perform the adjustments listed below.

4-2-1. Exit side tracking adjustment
4-2-2. CTL head (ACE assembly) position adjustment
4-2-3. Audio head (ACE assembly) azimuth adjustment
4-2-4. Audio head (ACE assembly) height adjustment

4-2-1. Exit Side Tracking Adjustment

1) Set the parallel plate (SL-0657 in the list of fixtures and tools) up against the unit as shown in Fig. 4-9, and turn the tilt adjustment screw to adjust the audio head vertically.

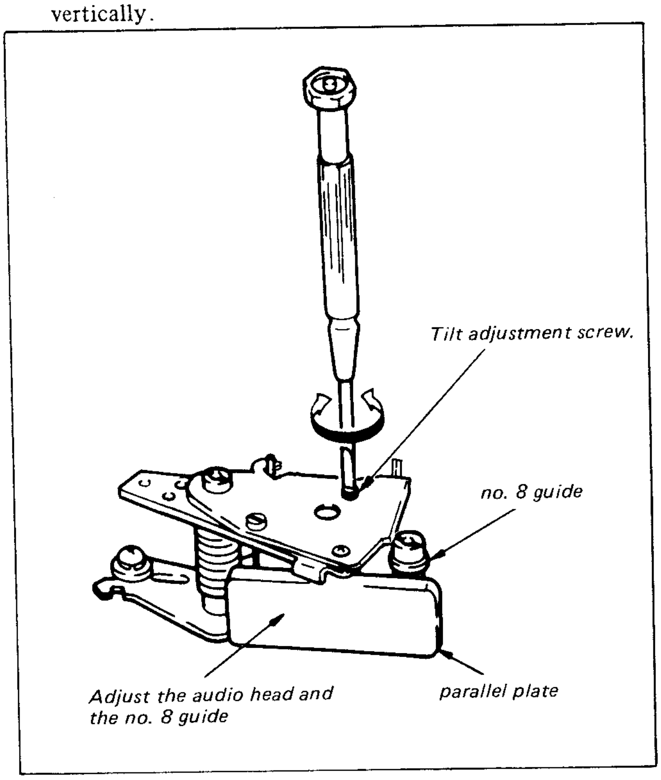

Tilt adjustment screw.
no. 8 guide
Adjust the audio head and the no. 8 guide
parallel plate

Fig. 4-9.

2) Connect the oscilloscope to JW42 or Pin ⑭ of IC5 (VT-1 board). Connect the external trigger to JW43 or Pin ③ of B2 (VT-1 board)

3) Play the tracking section of the alignment tape. Turn the tracking knob counterclockwise until the radio frequency output waveform amplitude is reduced to about 60% of its maximum level.

4) Raise the No. 7 and No. 8 guides (turn the respective guide nuts counterclockwise) and observe the radio frequency exit free waveform when the tape runs free.

Note:
Be careful not to raise the guide too far. Raise it about 0.2 to 0.3 mm.

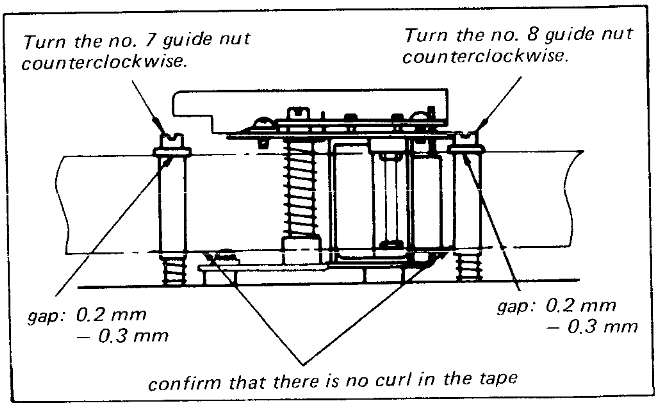

Turn the no. 7 guide nut counterclockwise.
Turn the no. 8 guide nut counterclockwise.
gap: 0.2 mm – 0.3 mm
gap: 0.2 mm – 0.3 mm
confirm that there is no curl in the tape

Fig. 4-10.

5) At this time, confirm that the exit free waveform is with the range shown in Fig. 4-11 (a) and (b).

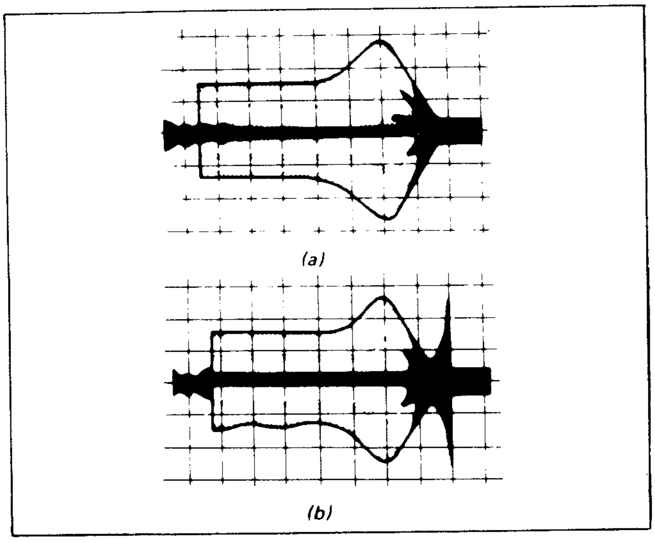


Fig. 4-11.

[When the waveform is outside this range]

- When the waveform is outside this range and has the form shown in Fig. 4-12, turn the tilt adjustment screw clockwise to adjust until the waveform is within the required range.

Note:
Complete the adjustment by turning the adjustment screw in the direction of tightening (clockwise).

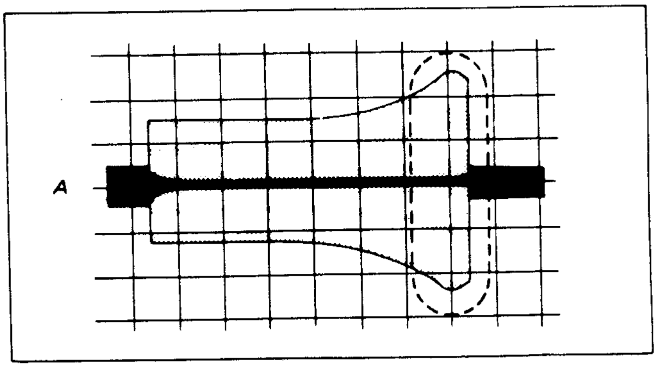


Fig. 4-12.

- When the exit free waveform is outside of the requirea range and has the form shown in Fig. 4-13, turn the tilt adjustment screw counterclockwise to produce waveform A (Fig. 4-12), then turn it clockwise to bring the waveform within the required range.

Note:
Finish the adjustment by turning the adjustment screw in the direction of tightening (clockwise).

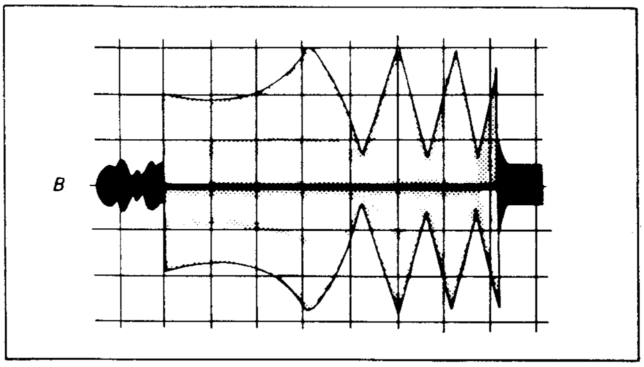


Fig. 4-13.

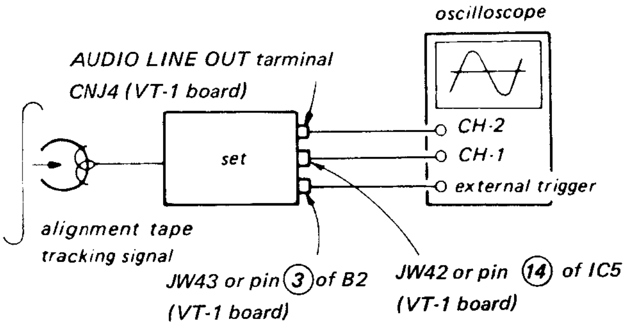
6) Turn the No. 7 guide nut clockwise to flatten the waveform.
7) Turn the No. 8 guide nut clockwise to line the No. 8 guide up with the tape (lower it so that there is no curl just before the waveform starts to change).
8) If the radio frequency waveform is as shown in Fig. 4-12 on the exit side, repeat the adjustment.

4-2-2. CTL Head (ACE Assembly) Position Adjustment

This adjustment includes the mechanical CTL head mounting position adjustment and the electrical tracking control center adjustment. The tracking control center adjustment is to be performed first, followed by the mechanical adjustment of the head mounting position.

[Connections]

1) Playback


oscilloscope
AUDIO LINE OUT tarminal
CNJ4 (VT-1 board)
set
CH-2
CH-1
external trigger
alignment tape
tracking signal
JW43 or pin ③ of B2
(VT-1 board)
JW42 or pin ⑭ of IC5
(VT-1 board)

[Method of adjustment]

1) Play the tracking signal section of the alignment tape.
2) Turn the tracking control knob clockwise or counterclockwise to the center click position. Confirm that the amplitude of the radio frequency output signal is at its maximum level. Also confirm that the audio signal 0 level position occurs at the location of the channel B waveform. If the necessary standards are not met follow the method of adjustment 3), 4)

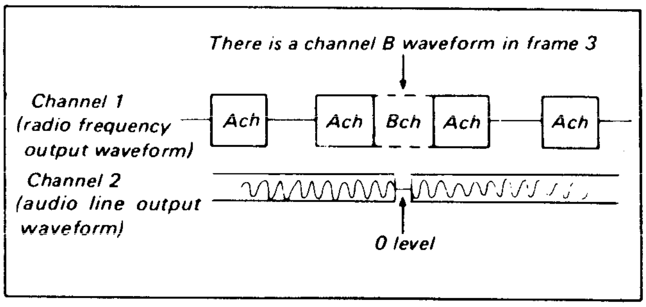

There is a channel B waveform in frame 3
Channel 1
(radio frequency
output waveform)
Ach
Ach
Bch
Ach
Ach
Channel 2
(audio line output
waveform)
0 level

Fig. 4-14.

3) Tracking center adjustment
   Refer to electrical adjustment 3) in section 5-3-2.
4) CTL head position adjustment
   a. Set the tracking control knob at the center click position.
   b. Loosen the 2 ACE assembly position adjustment screws, then use a tool such as an ordinary screwdriver to slide the ACE assembly to where the radio frequency output waveform amplitude becomes a maximum.
   c. Play the color bar signal on the alignment tape and check the picture quality.
   d. Tighten the position adjustment screws, then lock them.

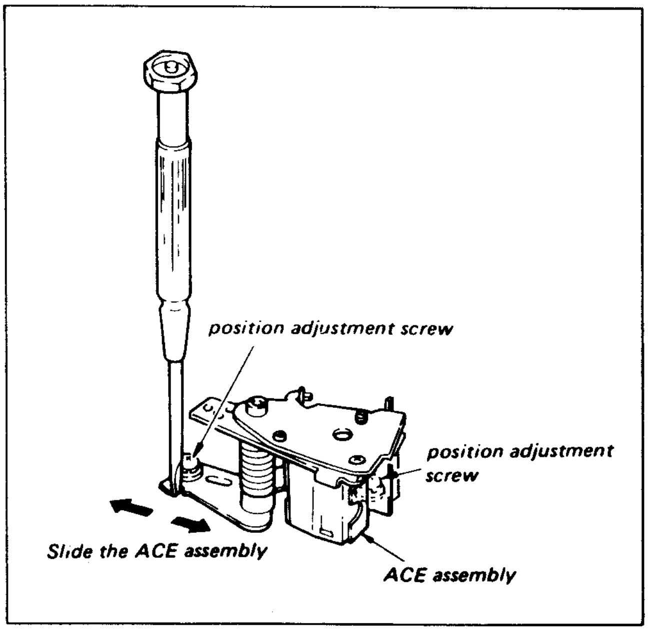
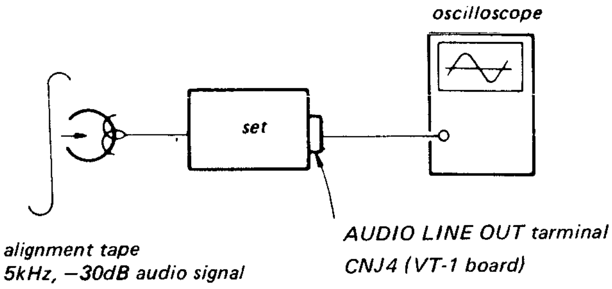

position adjustment screw
position adjustment
screw
Slide the ACE assembly
ACE assembly

Fig. 4-15.

4-2-3. Audio head (ACE Assembly) Azimuth Adjustment

[Condition]

1) Playback


oscilloscope
set
alignment tape
5kHz, −30dB audio signal
AUDIO LINE OUT tarminal
CNJ4 (VT-1 board)

[Method of adjustment]

1) Play the 5kHz, −30dB audio signal section (RF sweep section) of the alignment tape.
2) Adjust the azimuth adjustment screw until the output level (amplitude of waveform) is a maximum.

Note:
Complete the adjustment by turning the adjustment screw in the direction of tightening (clockwise).

3) After adjustment, lock the adjustment screw.

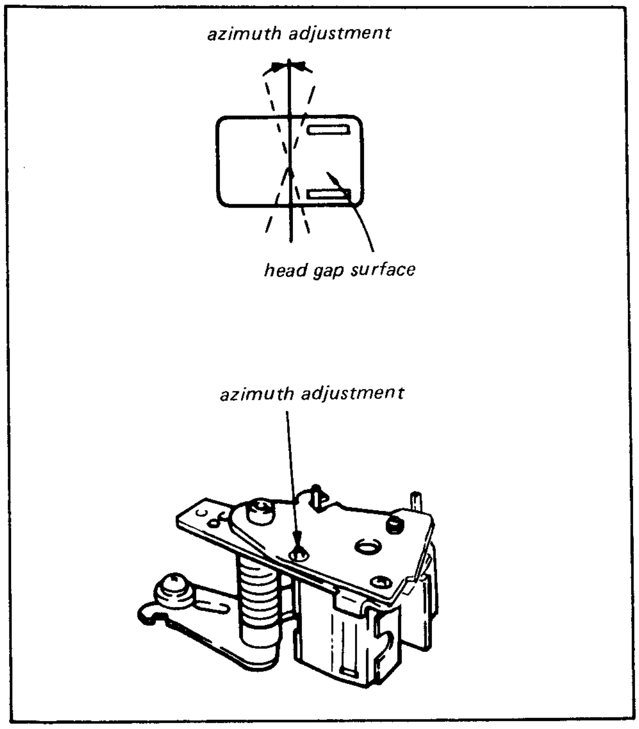

azimuth adjustment
head gap surface
azimuth adjustment

Fig. 4-16.

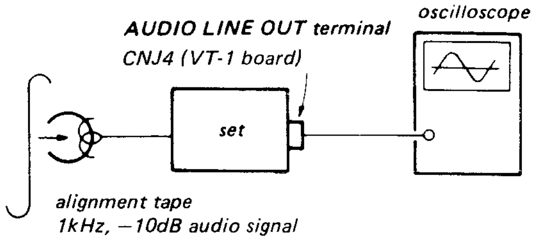
4-2-4. Audio Head (ACE Assembly) Height Adjustment

[Condition]

This adjustment must only be performed after the exit side tracking adjustment has been completed.

[Connections]

1) Playback


oscilloscope
AUDIO LINE OUT terminal
CNJ4 (VT-1 board)
set
alignment tape
1kHz, −10dB audio signal

[Method of adjustment]

1) Play the 1kHz, −10dB audio signal section (Tracking section) of the alingment tape.
2) Adjust the height adjustment nut so that the amplitude of the audio line output waveform (1kHz) becomes a maximum.

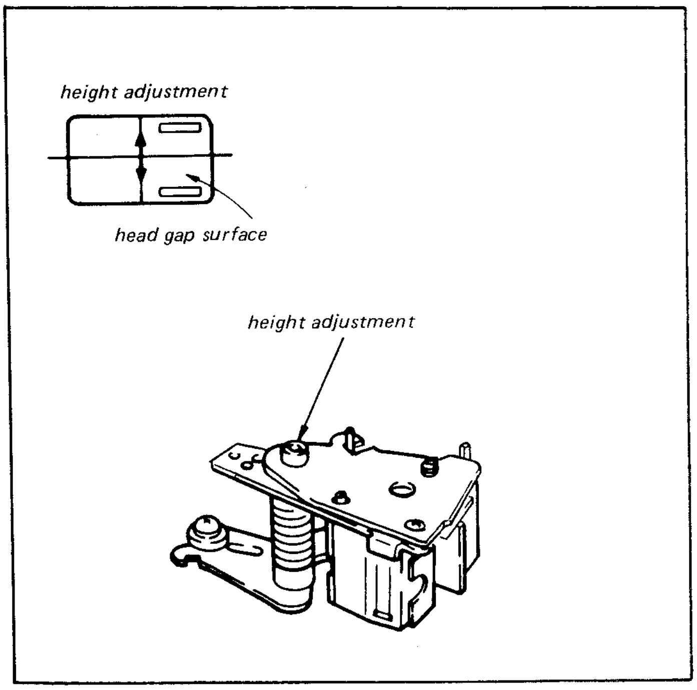

height adjustment
head gap surface
height adjustment

Fig. 4-17.

4-3. HOW TO INSPECT THE TAPE TRAVELING WHEN ADJUSTING THE TAPE PATH

Adjust and check the tape path using the alignment tape following the adjustment guide, then check the tape travel using the procedure below.

1) Get one L-830 reel ready (these are widely available commercially). Remove the cassette cover referring to Fig. 4-1 of the adjustment guide.
2) Run the L-830 tape in playback mode and check the following points.
    i) Entrance side
    Confirm that the tape contacts the upper flange of the No. 5 and No. 6 guides and the lower flange of the No. 4 guide, and is not damaged or bent. (Some tape curl is allowed but the tape must not be creased.) (Fig. 4-18)
    ii) Exit side
    Confirm that the tape contacts the upper flange of the No. 7 guide and the No. 8 guide. Confirm that the tape dose not contact the upper or lower flange of the No. 10 guide, and is not scratched. (Some tape curl is allowed but the tape must not be creased.) (Fig. 4-19)
    iii) If the tape was found not to be running correctly in step ii), readjust the tape path using the alignment tape, following the adjustment guide.
    If the tape is not running correctly on the entrance side, refer to section 4-12 of the adjustment guide. If the tape is not running correctly on the exit side, refer to section 4-13 of the adjustment guide.

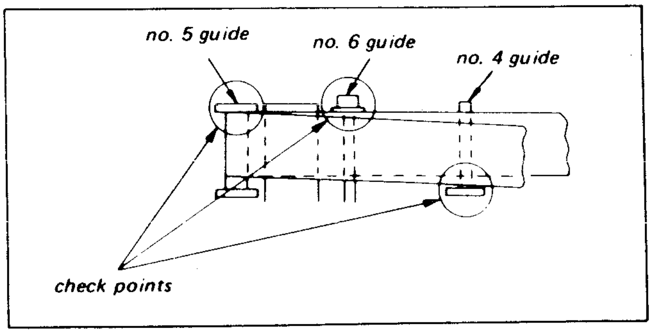


Fig. 4-18.

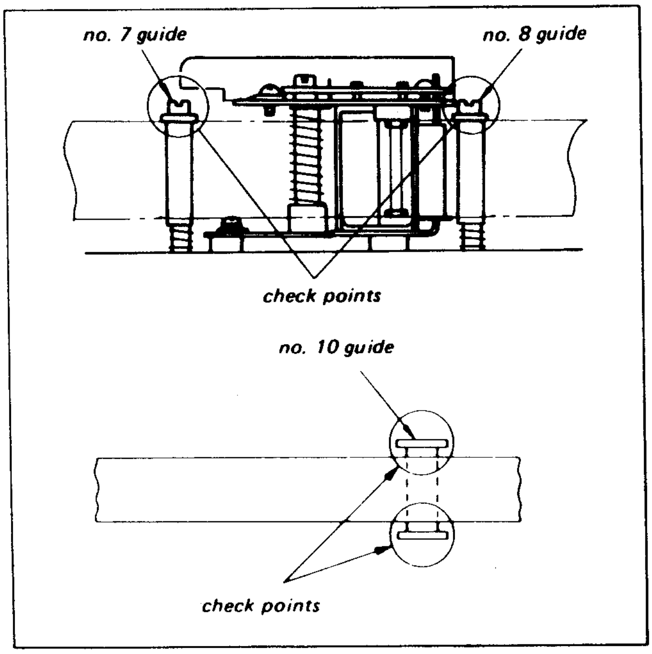


Fig. 4-19.

5. ELECTRICAL ADJUSTMENT

All the electrical adjustment can be performed by using the equipment menitoned below, the alignment tape, and the PAL colour bar signal (100%).

[Equipment Required]

1. PAL Colour Monitor TV
2. Oscilloscope, Dual-trace, Bandwidth... more than 10 MHz with delay mode
3. Frequency Counter
4. PAL Colour-Bar Generator
5. Digital voltmeter
6. Audio Signal Generator
7. Audio level meter (VTVM)
8. Attenuator
9. Alignment Tape, type: KR5-2H, Code No. 8-969-995-52
10. Alignment Tool (Adjusting screwdriver for semi-fixed resistors and coils)
Jig No. SL-0001, Code No. 7-700-733-01

[Setup for Adjustment]

The antenna should be connected correctly to the antenna input terminal of the videocassette recorder.

It is important that the video output signal satisfies the specification because the telecast signal received by the incorporated tuner of the videocassette recorder is utilized as the adjustment signal of the machine. The incorporated tuner should be set to the channel with the best reception. The video signal should be checked with an oscilloscope connected to VIDEO OUT (BNC connector). Verify that the sync signal amplitude is approx. 0.3 Vp-p and the video signal amplitude is approx. 0.7 Vp-p at peak. Adjust the fine tuning while observing the signal and the TV screen so that the burst signal amplitude becomes approx. 0.3 Vp-p ± 0.1 Vp-p. Also confirm that there is not spikes observed at the sync signal portion. (See Fig. 5-1.)

The video (colour-bar) signal for the adjustment is shown in Fig. 5-1.

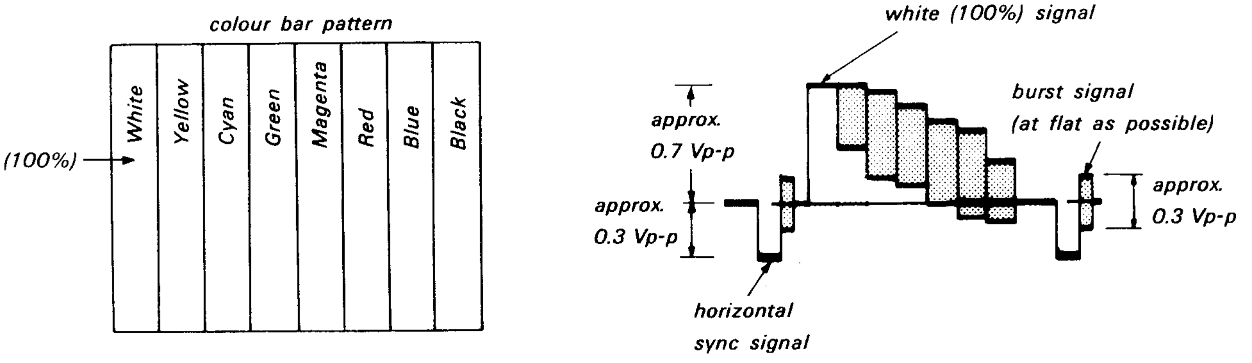


Fig. 5-1. Video (colour-bar) signal

[Alignment Tape]
KR5-2H

	Video signal	Audio signal	Playing time	Use for
1.	Colour bars	3 kHz −10 dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333 Hz −30 dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5 kHz −30 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment marker: 1MHz, 2MHz 3.58MHz, 4.5MHz, 5.2MHz
4.	Tracking 1 MHz (CH-A) *1 (Channel B is inserted in every 3 frames.)	1 kHz −10 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check (Check if *1 and *2 are the same position.)

[Alignment Tool for Semi-fixed Variable Resistors and Coils]
Semi-fixed variable resistors and inductances should be adjusted with the alignment tool exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed circuit board.

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors.

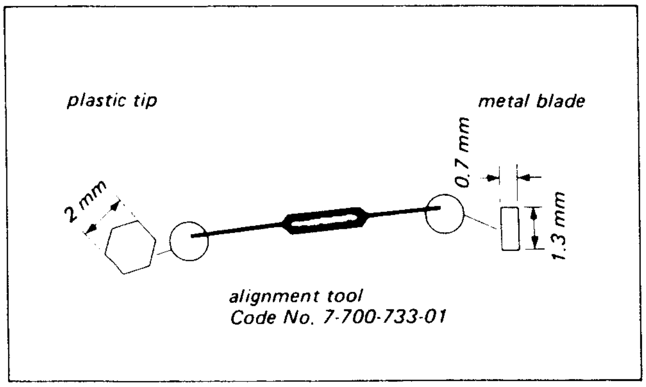

plastic tip
metal blade
2 mm
0.7 mm
1.3 mm
alignment tool
Code No. 7-700-733-01

Fig. 5-2. Alignment tool

[Required levels and Impedanced of Input and Output]
Video
Input VIDEO IN: BNC connector
1Vp-p $^{+1.0}_{-0.5}$ Vp-p
75Ω unbalanced, sync negative
VIDEO OUT: BNC connector
1Vp-p ±1.0 Vp-p
75Ω unbalanced, sync negative

Audio
Input AUDIO IN: phono jack
47 kΩ, −10 dBs
(0 dBs = 0.775V rms)
Output AUDIO OUT: phono jack
Load impedance less than 10 kΩ
−10 dBs with 47 kΩ load unbalanced

[Colour Bar Signal]
The 100% colour bar signal recorded on the Alignment tape is shown in Fig. 5-3.

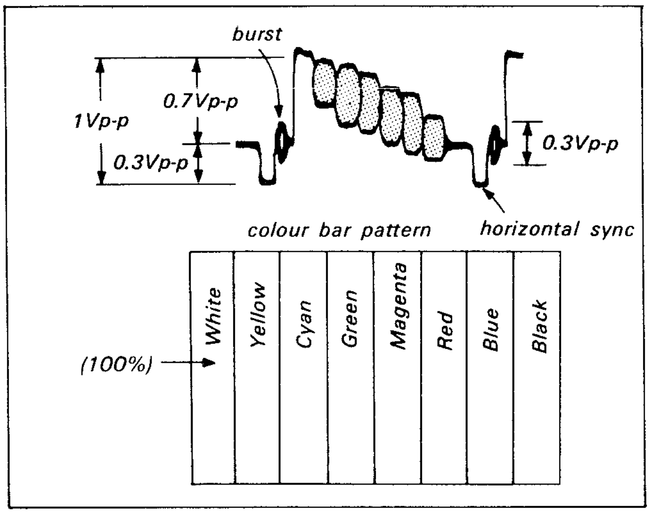
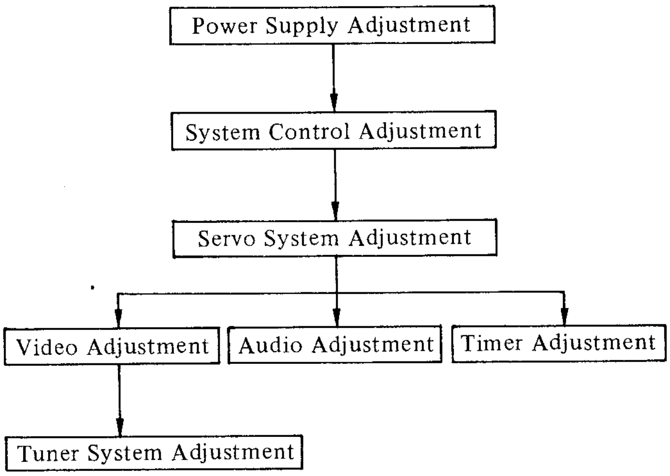

burst
1Vp-p
0.7Vp-p
0.3Vp-p
0.3Vp-p
colour bar pattern
horizontal sync
(100%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
Black

Fig. 5-3. Colour bar signal recorded on the alignment tape

[Adjustment procedure]
Adjust in the order given below.


Power Supply Adjustment
System Control Adjustment
Servo System Adjustment
Video Adjustment
Audio Adjustment
Timer Adjustment
Tuner System Adjustment

5-1. POWER SUPPLY CHECK (PS-92 Board)

The power requirement is 220 Vac ±4.4 Vac (VOLTAGE selector: 220 V – 240 V) or 110 Vac ±2.2 Vac (VOLTAGE selector: 110 V – 127 V).

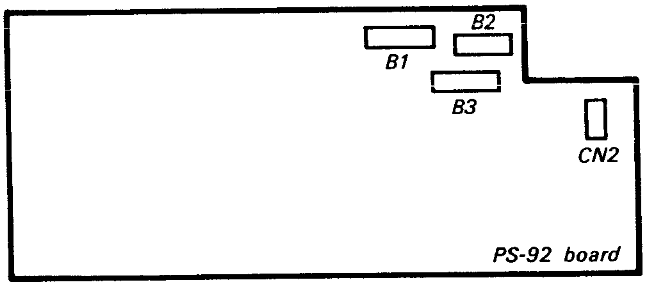


Fig. 5-4. Component layout (Conductor side)

Measure in STANDBY mode.

1. UN 12V Check
   Pin ③ of CN2 shall be 12.3Vdc ± 0.2Vdc
2. UN 40V Check
   Pin ⑥ of B2 shall be 39Vdc ± 2Vdc
3. UN-24V Check
   Pin ⑤ of B2 shall be −24Vdc ± 2Vdc

Measure in E-E mode (power supply switch ON).

4. SW12V (M) Check
   Pin ② of B3 shall be 12.2 Vdc ± 0.2Vdc
5. SW12V (E) Check
   Pin ④ of B2 shall be 12.2Vdc ± 0.2Vdc
6. SW9V Check
   Pin ② of B2 shall be 9Vdc ± 0.1Vdc

5-2. SYSTEM CONTROL CHECK (SA-13 Board)

1. Clock Frequency Check

Mode: E-E
Signal: None
Frequency counter: Pin ㉖ of IC3
Check: f: 4.05 MHz ± 0.08 MHz

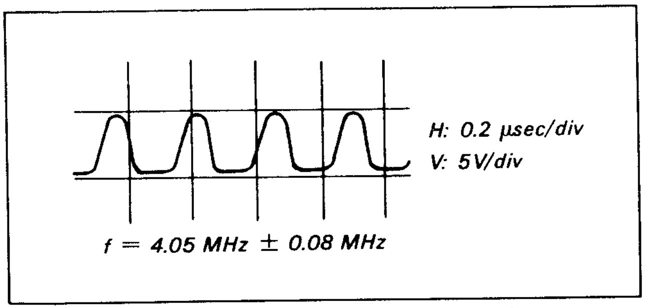


Fig. 5-5. System control check

5-3. SERVO SYSTEM ADJUSTMENT

Alignment Sequence
5-3-1. Reel motor control system adjustment
5-3-2. Drum capstan servo system adjustment

5-3-1. Reel Motor Control System Adjustment

1) FWD Torque Adjustment (SA-13 Board)

See "Mechanical Adjustment"

5-3-2. Drum/Capstan Servo System Adjustment

1) Voltage Check (SA-13 board)

i) Pin ⑪ of IC304 shall be 5.00V ± 0.25V.

2) Clock Check (SA-13 board)

i) Pin ㉙ of IC304 shall be about 0.7 Vp-p.

3) Drum DC Bias Adjustment (SA-13 Board)

Mode: Playback
Signal: Alignment tape colour bar or monoscope
Digital voltmeter: Pin ㊼ of IC304 (TP-7)

[Adjustment method]

Adjust to 1.8Vdc ± 0.1Vdc with RV304.

4) Capstan DC bias Adjustment (SA-13 Board)

Mode: Playback
Signal: Alignment tape colour bar or monoscope
Digital voltmeter: Pin ⑦ of IC304 (TP-6)

[Adjustment method]

Adjust to 1.8Vdc ± 0.2Vdc with RV308.

5) Tracking Center Adjustment (SA-13 Board)

Mode: E-E
Signal: Colour bar
Oscilloscope: CH1 Pin ㊽ of IC304 (TP-4)
CH2 Pin ③ of IC304 (TP-5)

[Adjustment method]

i) Set the TRACKING knob to the center click position.
ii) Adjust to 3.2 msec ± 0.1 msec with RV307.

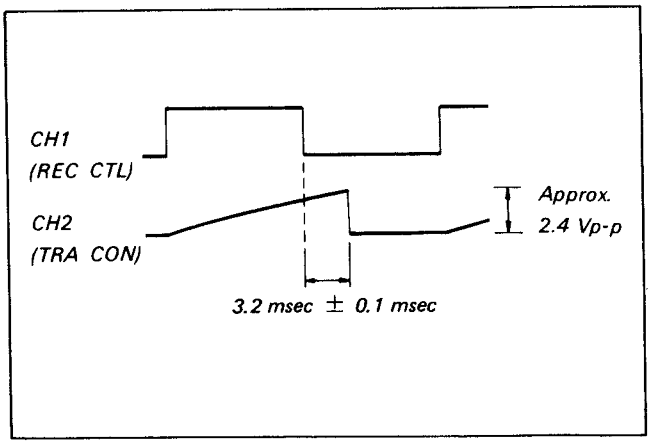


Fig. 5-6. Tracking center adjustment

6) **RF Switching Position Adjustment (SA-13 Board)**

Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope CH1: Pin ㉞ of IC304 (TP-3)
CH2: Pin ⑤ of CN13 (TP-2)

[Adjustment method]

1) Turn the TRACKING knob and set for the optimum state while observing the monitor TV screen.
2) Adjust RV303 so that the lock phase of RF SW PULSE (A ch) is 7H ± 0.5H (448μsec ± 30μsec).
3) Adjust RV302 so that the lock phase of RF SW PULSE (B ch) is 7H ± 0.5H (448μsec ± 30μsec).

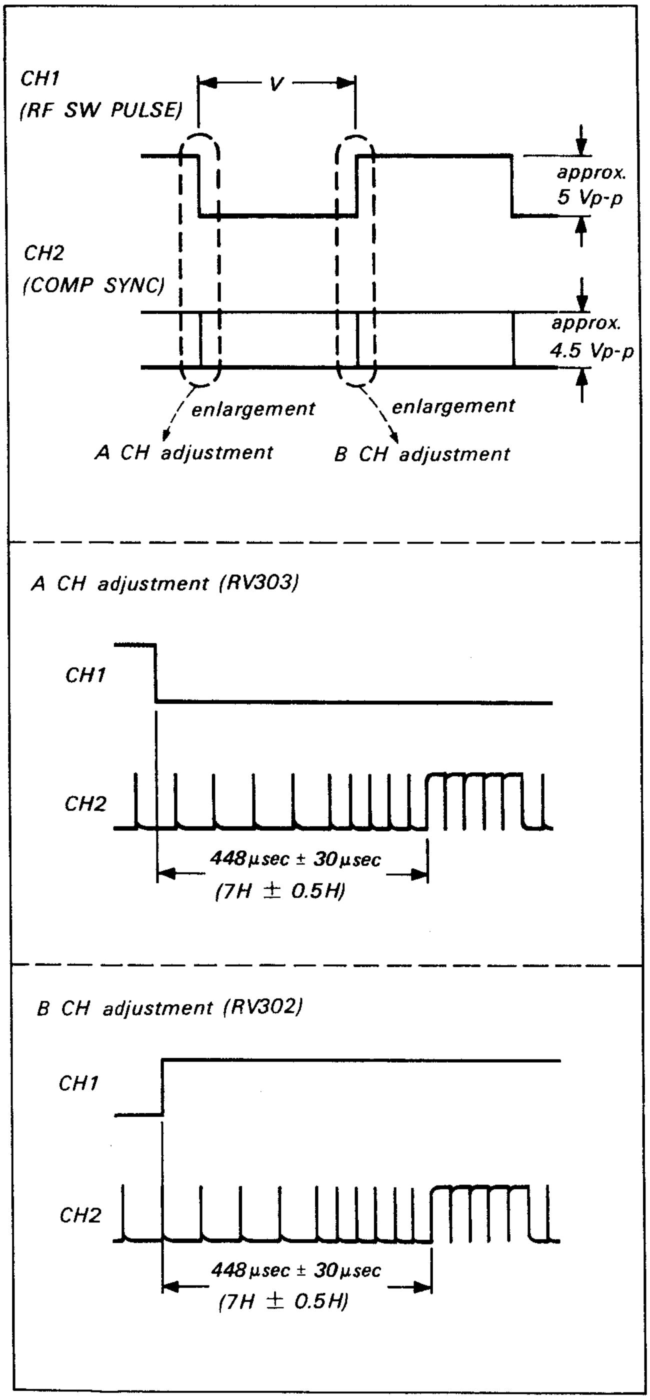

CH1
(RF SW PULSE)
V
approx. 5 Vp-p
CH2
(COMP SYNC)
approx. 4.5 Vp-p
enlargement
enlargement
A CH adjustment
B CH adjustment
A CH adjustment (RV303)
CH1
CH2
448µsec ± 30µsec
(7H ± 0.5H)
B CH adjustment (RV302)
CH1
CH2
448µsec ± 30µsec
(7H ± 0.5H)

Fig. 5-7. RF switching positon adjustment

7) **Drum Lock Phase Adjustment (SA-13 Board)**

Mode: Record
Signal: Colour bar
Oscilloscope: CH1 Pin ㉞ of IC304 (TP-3)
CH2 Pin ⑤ of CN13 (TP-2)

[Adjustment method]

Adjust RV301 so that the Lock Phase of CH1 (RF SW PULSE) and CH2 (COMP SYNC) is 7H ± 0.5H (448 μsec ± 30μsec).

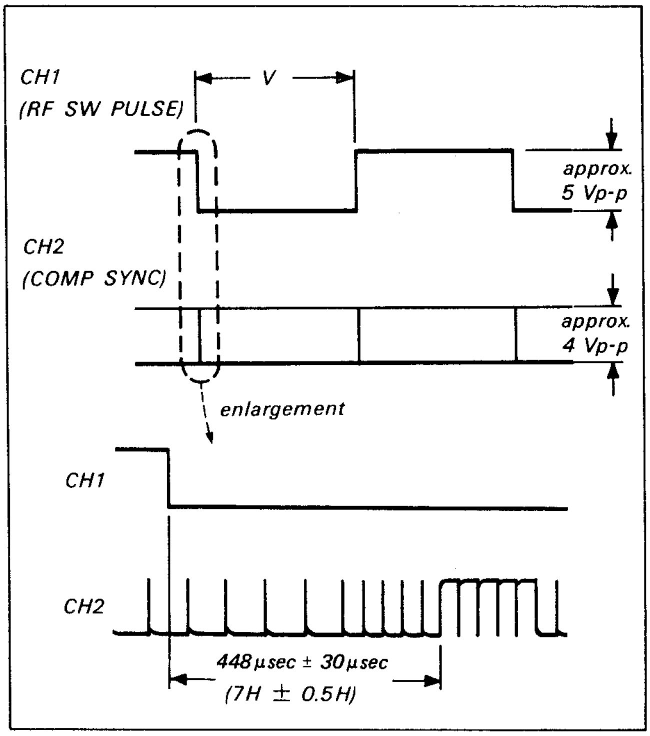

CH1
(RF SW PULSE)
V
approx. 5 Vp-p
CH2
(COMP SYNC)
approx. 4 Vp-p
enlargement
CH1
CH2
448µsec ± 30µsec
(7H ± 0.5H)

Fig. 5-8. Drum lock phase adjustment

8) **PICTURE SEARCH fH Adjustment (SA-13 Board)**

Mode: FWD PICTURE SEARCH (CUE)
Signal: Alignment tape colour bar or monoscope
Oscilloscope: Pin ⑤ of CN13 (COMP SYNC: TP-2)

[Adjustment method]

Adjust RV305 so that the horizontal waveform interval between CUE and playback become 0 ± 0.2 μsec.

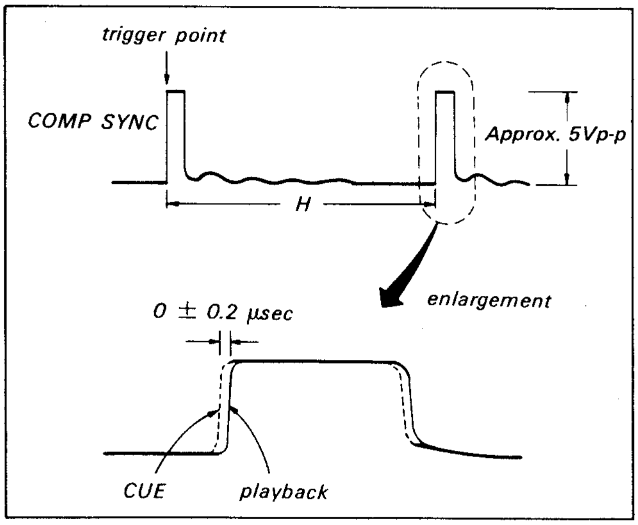

trigger point
COMP SYNC
Approx. 5Vp-p
H
enlargement
0 ± 0.2 µsec
CUE
playback

Fig. 5-9. PICTURE SEARCH fH

5-4. PAL VIDEO SYSTEM ADJUSTMENT

As a rule, first, adjust the Y signal system and check that it operates normally, then adjust the chroma signal system.
The adjustment sequence is shown below. The Y signal and chroma signal systems are adjusted for both playback and recording systems.
Colour video signal supplied by the PAL colour-bar generator is used as video input signal for video system adjustment in the record mode. Check that the sync and colour burst signals conform to the specifications designated in "Set-up for Adjustment" in Fig. 5-1.

5-4-1. Y Signal System Adjustment

1. Playback frequency characteristic adjustment
2. Expand adjustment
3. Playback video level adjustment
4. Y-comb adjustment
5. Dropout compensator adjustment
6. Sync AGC adjustment
7. Compress adjustment
8. Sync tip carrier set and deviation adjustment
9. White clip adjustment and dark clip
10. Y record current adjustment

5-4-2. Chroma Signal System Adjustment

1. AFC adjustment
2. AFC offset adjustment
3. APC adjustment
4. Pilot burst signal level adjustment
5. Chroma record current adjustment
6. Carrier balance adjustment
7. Chroma comb filter adjustment
8. JOG PLL adjustment
9. Shift adjustment
10. JOG exchange chroma level adjustment

5-4-1. Y Signal System Adjustment

1) Playback Frequency Characteristic Adjustment (VT-1 Board)

- Adjust both the A and B channels.
- The B channel indicated by ( ).

Mode: Playback
Signal: Alignment tape RF sweep
Oscilloscope: Pin ⑭ of IC5 (or JW42)
External trigger: Pin ③ of B2 (or JW43)

[Adjustment method]

i) Turn tracking knob to maximum output.
ii) Adjust RV20 to make the 2 MHz amplitude of A and B channels equal.
iii) Set the trigger slope to −(+).
iv) Adjust the 5.2 MHz amplitude to 56 — 62% of the 2 MHz amplitude with RV21 (RV22).

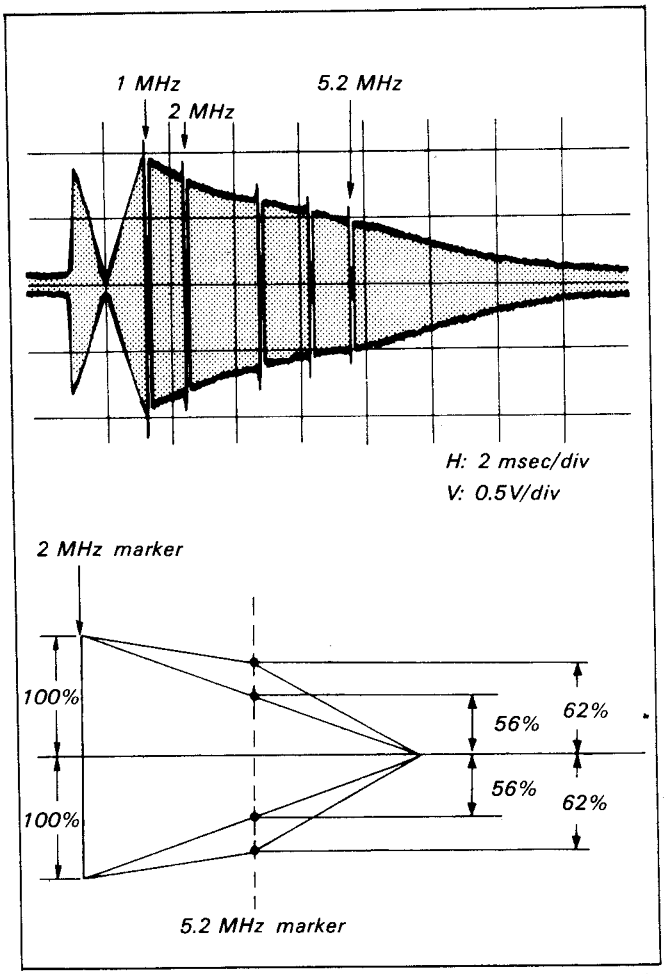


Fig. 5-10. Playback amplifier frequency characteristic adjustment

2) **Expand Adjustment (VT-1 Board)**
Mode: Playback
Signal: Colour bar
Digital voltmeter: See Fig. 5-11.

[Adjustment method]

i) Adjust to 0.45 Vdc ± 0.01 Vdc with RV5.

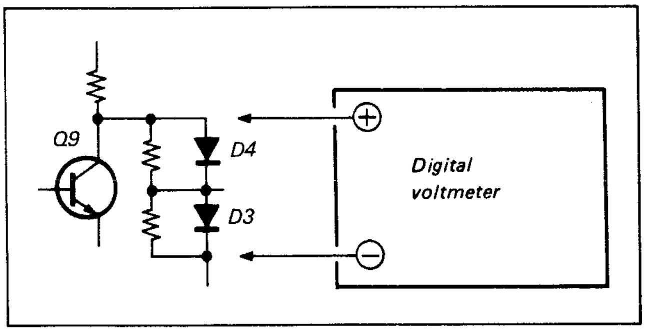


Fig. 5-11.

3) **Y-Comb Adjustment (VT-1 Board)**
Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope: Pin ⑧ of IC401 (Attach 50 kΩ resistor to tip of probe (10:1))

[Adjustment method]

i) Adjust RV401 for minimum output.

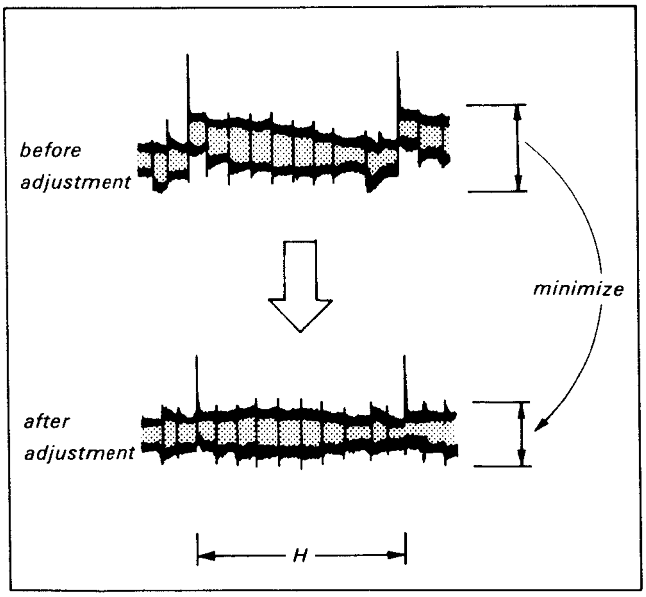


Fig. 5-12. Y-comb adjustment

4) **Playback Video Level Adjustment (VT-1 Board)**
Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope: VIDEO OUT (CNJ2: 75Ω terminated)

[Adjustment method]

i) Adjust to 1.0 Vp-p ± 0.05 Vp-p with RV6.

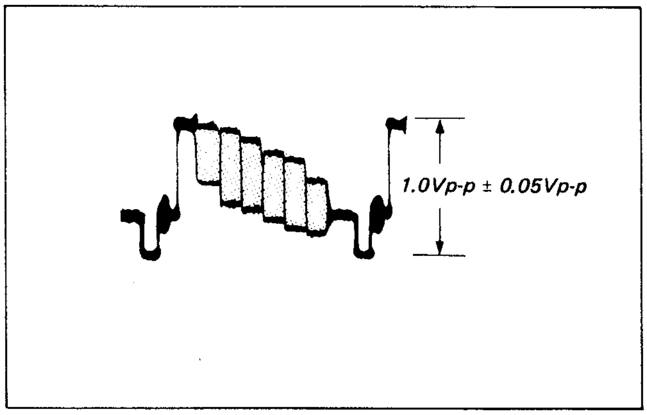


Fig. 5-13. Playback video level adjustment

5) **Dropout Compensator Adjustment (VT-1 Board)**
Mode: Playback
Signal: A recorded tape with dropouts

[Adjustment method]

i) Turn RV2 fully counterclockwise (↶) as seen from the pattern side. In this state, dropouts appear on the monitor screen.

ii) Slowly turn RV2 clockwise (↷) and set to make the dropouts disappear.

iii) Rewind the tape and verify that the dropouts described in (i) above have disappeared.

6) **Sync AGC Adjustment (VT-1 Board)**

Mode: E-E

Oscilloscope: VIDEO OUT (CNJ2: 75Ω terminated)

Signal: Colour bar (V:S = 7:3)

[Adjustment method]

i) Adjust to 1.0 Vp-p ± 0.05 Vp-p with RV4.

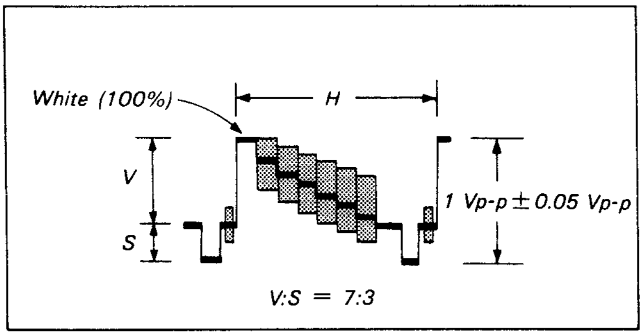


Fig. 5-14. Sync AGC adjustment

7) **Compress Adjustment (VT-1 Board)**

Mode: E-E

Signal: None (Install a shorting plug in VIDEO IN jack.)

Digital voltmeter: See Fig. 5-15.

[Adjustment method]

i) Adjust to 0.3 Vdc ±0.01 Vdc with RV7.

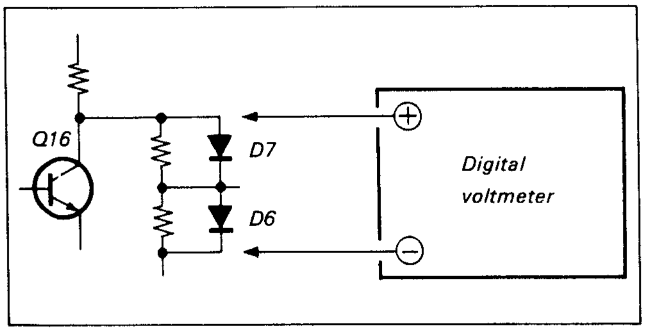


Fig. 5-15.

8) **Sync Tip Carrier Set and Deviation Adjustment (VT-1 Board)**

Making this adjustment only after making sure that section 4) "Playback video level adjustment" has been completed.

Mode: Record (or E-E) and playback

Signal: Colour bar

Frequency counter: Pin ㉕ of IC1

Oscilloscope: Q17 collector (for REC/E-E mode) and VIDEO OUT (for PB mode, 75Ω terminated)

[Adjustment method]

i) Input the colour bar signal and set up E-E mode.

ii) Check the Y signal level at Q17 collector.

(See Fig. 5-16 This Y signal level is proportional to the playback video level (proportional to the deviation) as descrived later. This Y signal level is 0.4 Vp-p in typical case.)

iii) Turn off the signal input or install a shorting plug to VIDEO IN jack.

iv) Connect the frequency counter to Pin ㉕ of IC1, and adjust RV8 until the reading is 3.8 MHz ± 0.04 MHz.

v) Input the colour bar signal and record.

vi) Playback the recorded portion of the tape, and check the playback video level at VIDEO OUT (75Ω terminated).

Specification: 1.0 Vp-p ± 0.05 Vp-p (See Fig. 5-17.)

vii) If the specification is not met, input the colour bar signal, set up the E-E mode, and adjust RV9 to correct the playback video level error, while observing the Y signal level at Q17 collector, and repeat steps iii) through vi).

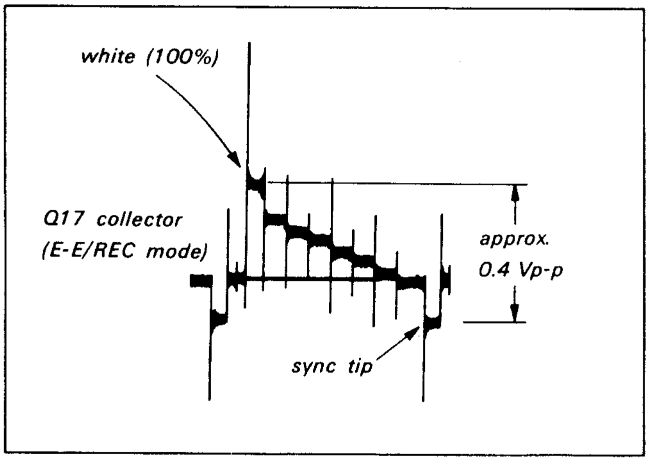


Fig. 5-16. Deviation adjustment (1)

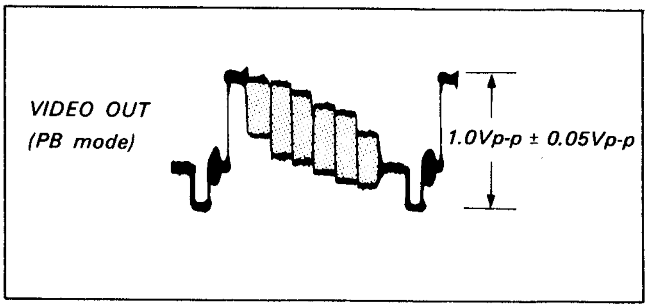


Fig. 5-17. Deviation adjustment (2)

9) **White Clip adjustment and Dark Clip Check (VT-1 Board)**

Mode: E-E
Signal: Colour bar
Oscilloscope: Collector of Q17

[Adjustment method]

i) Check that the signal tip (dark peak) is 70% ± 10%.
ii) Adjust RV10 so that the signal tip (white peak) is 200% ± 10%.

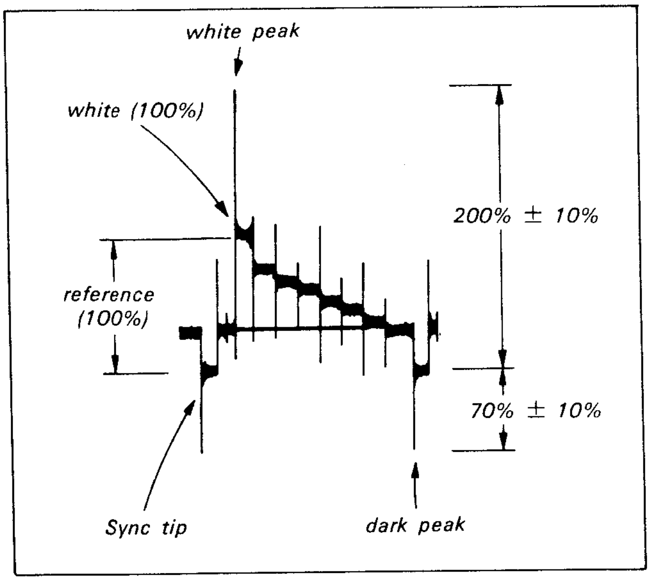

white peak
white (100%)
200% ± 10%
reference (100%)
70% ± 10%
Sync tip
dark peak

Fig. 5-18. Dark clip and white clip adjustment

10) **Y Record Current Adjustment (VT-1 Board)**

Mode: Record
Signal: None (Install a shorting plug to VIDEO IN jack.)
Oscilloscope: Center terminal of RV3 (Base of Q602)

[Adjustment method]

i) Adjust to 680 mVp-p ± 10 mVp-p with RV3.

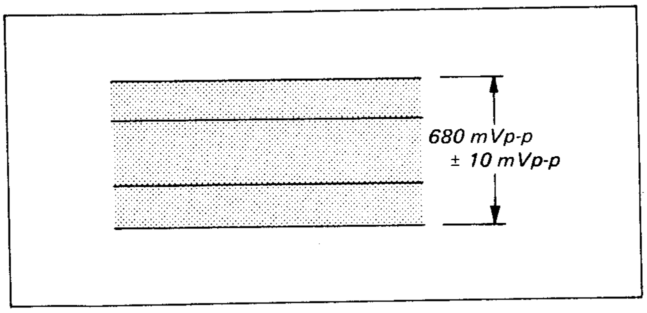

680 mVp-p
± 10 mVp-p

Fig. 5-19. Y record current adjustment

5-4-2. Chroma Signal System Adjustment

1) **AFC Adjustment (VT-1 Board)**

Mode: E-E
Signal: Colour bar
Oscilloscope: Pin ㉖ of IC003

[Adjustment method]

i) Adjust to 4.45Vdc ± 0.01 Vdc with RV13.
ii) Playback the colour bar portion of the alignment tape, and check that the colour on the monitor TV for correct quality.

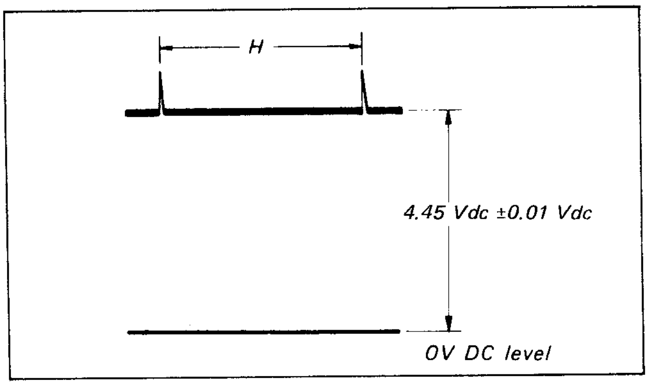

H
4.45 Vdc ±0.01 Vdc
0V DC level

Fig. 5-20. AFC adjustment

2) **AFC Offset Adjustment (VT-1 Board)**

Mode: Record
Signal: Colour bar
Oscilloscope: Pin ㉖ of IC003

[Adjustment method]

i) Adjust RV14 so that the fluctuation of DC level is minimum.

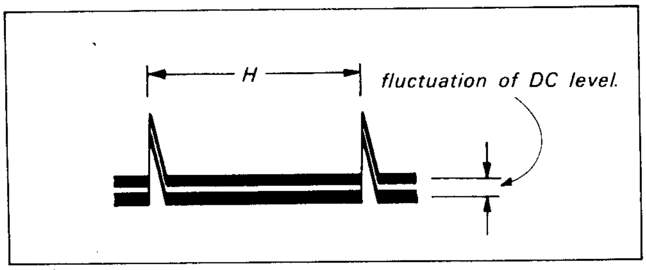

H
fluctuation of DC level.

Fig. 5-21. AFC offest adjustment

3) **APC adjustment (VT-1 Board)**

Mode: Playback
Signal: Alignment tape colour bar
Frequency counter: Pin ① of B1 (Emitter of Q605)

[Adjustment method]

i) Adjust to 4.433619 MHz ± 5 Hz with RV17.

4) **Pilot Burst Signal Level Adjustment (VT-1 Board)**

Mode: E-E
Signal: Colour bar
Oscilloscope: Pin ① of IC3

[Adjustment method]

i) Align the pilot burst signal with the chroma signal level using RV16.

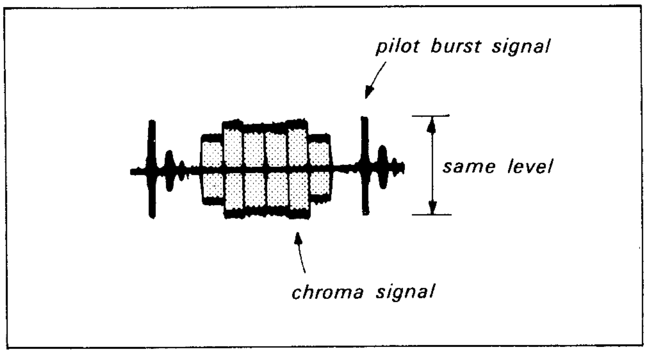


Fig. 5-22. Pilot burst signal level adjustment

5) **Chroma Record Current Adjustment (VT-1 Board)**

Mode: E-E
Signal: Colour bar
Oscilloscope: Emitter of Q601

[Adjustment method]

i) Adjust to 200 mVp-p ± 5 mVp-p with RV15.

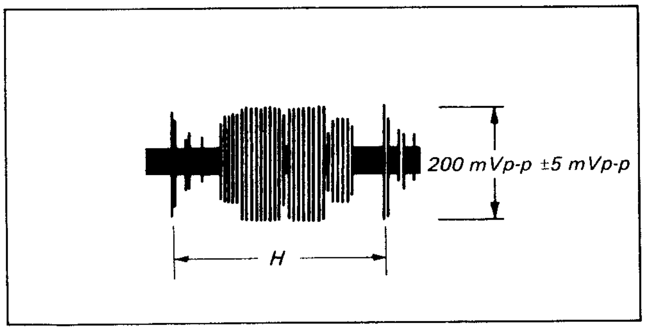


Fig. 5-23. Chroma record current adjustment

6) **Carrier Balance Adjustment (VT-1 Board)**

Mode: Playback
Signal: Alignment tape colour bar
Adjust while observing the monitor TV screen.

[Adjustment method]

i) Minimize beats with RV12.

7) **Chroma Comb Filter Adjustment (VT-1 Board)**

Mode: Playback
Signal: Alignment tape colour bar
Adjust while observing the monitor TV screen.

[Adjustment method]

i) Minimize beats with RV501 and LV501.

8) **JOG PLL Adjustment (VT-1 Board)**

Mode: E-E
Signal: Colour bar
Oscilloscope: Pin ⑩ of IC4

[Adjustment method]

Adjust to 20 μsec ± 1 μsec with RV19.

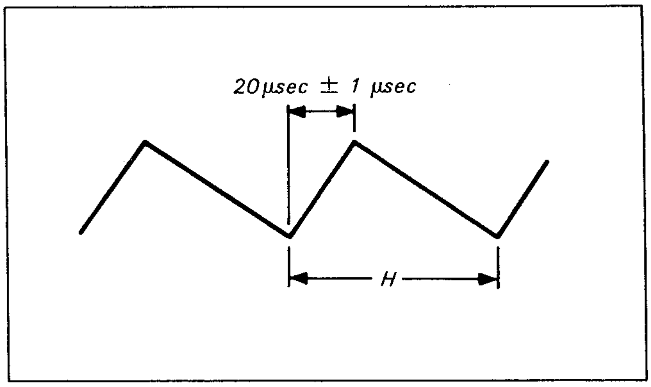


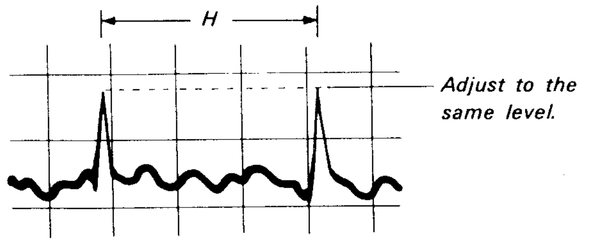
Fig. 5-24. JOG PLL adjustment

9) Shift Adjustment (VT-1 Board)

Mode: Playback
Signal: Alignment tape colour bar
Oscilloscope: Pin ㉔ of IC4

[Adjustment method]

i) Align the signal level (per 1H) with RV601.



Note: Signal sometimes appears on the lower side depending on the trigger condition.

Fig. 5-25. Shift adjustment

10) JOG Exchange Chroma level Adjustment (VT-1 Board)

Mode: PB.PAUSE (STILL)
Signal: Colour bar
Oscilloscope: Pin ⑧ of IC4

[Adjustment method]

i) Adjust RV18 so that the fluctuation of level is minimum.

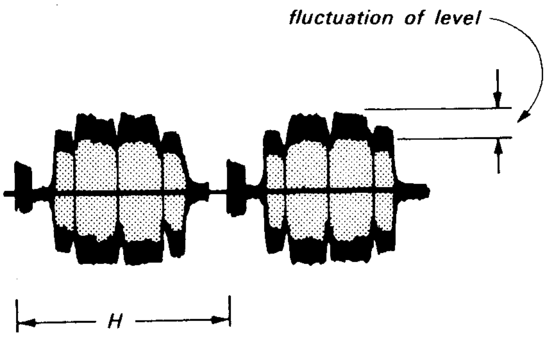


Fig. 5-26. JOG EXCH. C. level adjustment

5-4-3. SECAM Video System Adjustment

- Make this adjustment after aligning the PAL video system.
- For this adjustment, use the equipment listed below in conjunction with an alignment tape and SECAM colour-bar signals.

[Equipment Required]

(1) SECAM Colour Monitor TV
(2) Oscilloscope, Dual-trace, Bandwidth . . . more than 10 MHz with delay mode
(3) SECAM Colour-Bar Generator
(4) Alignment Tape, Type: KR5-1J, Code No. 8-969-996-03

[Setup for Adjustment]

In this adjustment, video signals obtained from the pattern generator will be used as adjustment signals. Therefore, the video output signals should be within the specifications. Verify video signals by connecting an oscilloscope to VIDEO OUT connector (75 Ω terminated). Check that the video signals are flat when the amplitude of the horizontal sync signal is about 0.3 Vp-p, the amplitude of the video portion is about 0.7 Vp-p, and the amplitude of the burst signal is about 0.3 Vp-p.
The video signal (clour-bar signal) used in this adjustment is shown in Fig. 5-30.

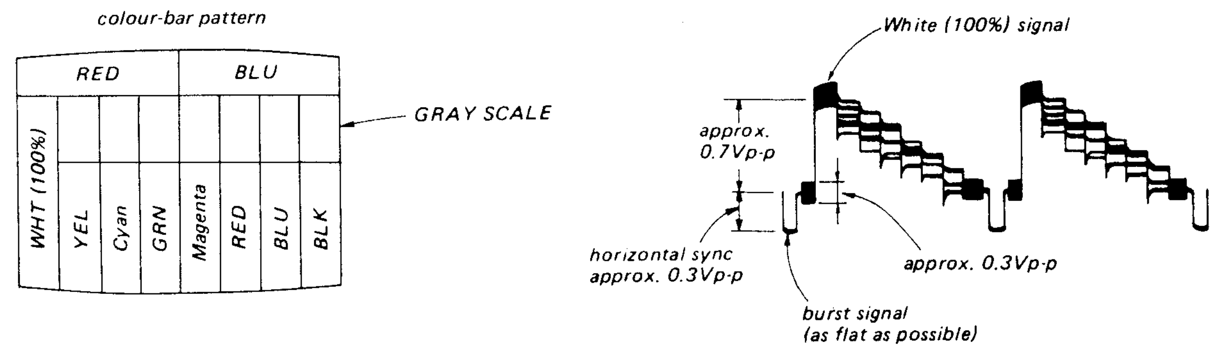

colour-bar pattern
RED
BLU
GRAY SCALE
WHT (100%)
YEL
Cyan
GRN
Magenta
RED
BLU
BLK
White (100%) signal
approx. 0.7Vp-p
horizontal sync approx. 0.3Vp-p
approx. 0.3Vp-p
burst signal (as flat as possible)

Fig. 5-30. SECAM video (colour-bar) signal

[Alignment Tape]
KR5-1J

	Video signal	Audio signal	Playing time	Use for
1.	Colour-bars	3 kHz −10 dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333 Hz −30 dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5 kHz −30 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment. marker: 1, 2, 3.58, 4.5, 5.2 MHz
4.	Tracking 1 MHz (CH-B) *1 (Channel B is inserted in every 3 frames.)	1 kHz −10 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check. (Check if *1 and *2 are the same position.)

[Colour-Bar Signal]

The 100% colour-bar signal recorded on the Alignment tape is shown in Fig. 5-31.

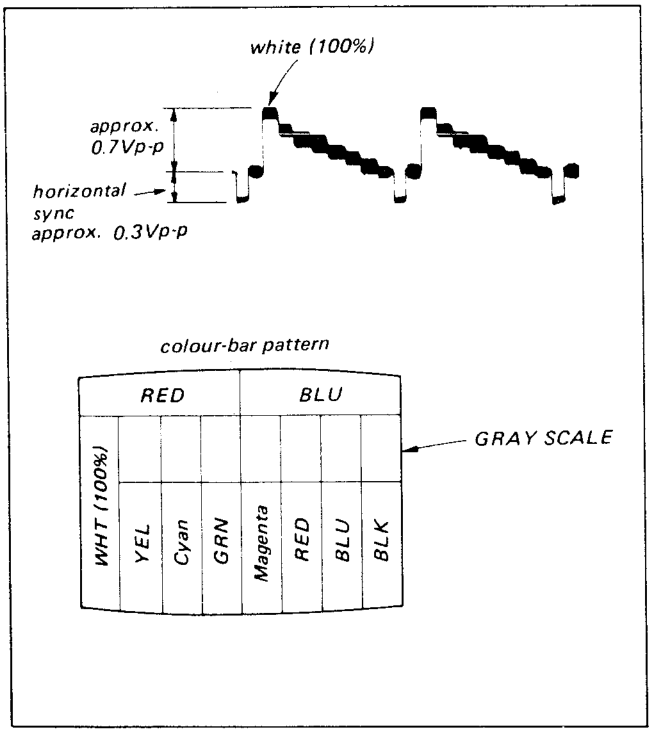

white (100%)
approx. 0.7Vp-p
horizontal sync approx. 0.3Vp-p
colour-bar pattern
RED
BLU
GRAY SCALE
WHT (100%)
YEL
Cyan
GRN
Magenta
RED
BLU
BLK

Fig. 5-31. Colour-bar signal recorded on the alignment tape

1) Bell Filter Adjustment (VT-1 Board)
Mode: E-E
Signal: SECAM colour-bar
Oscilloscope: Pin ㊶ of IC003

[Adjustment method]

Adjust LV302 until the waveform is flat. (See Fig. 5-32.)

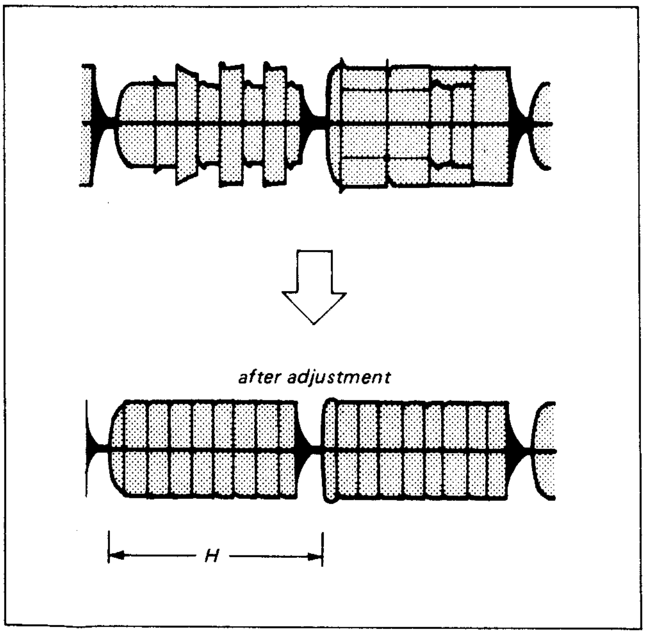

after adjustment
H

Fig. 5-32. Bell filter adjustment

2) SECAM ACK Adjustment (VT-1 Board)
Mode: E-E
Signal: SECAM colour-bar
Oscilloscope: Pin ⑨ of IC304

[Adjustment method]

i) Rotate LV303 to make the waveform amplitude to be maximum.

ii) Adjust RV301 to 5.5 V ±0.2 Vp-p.

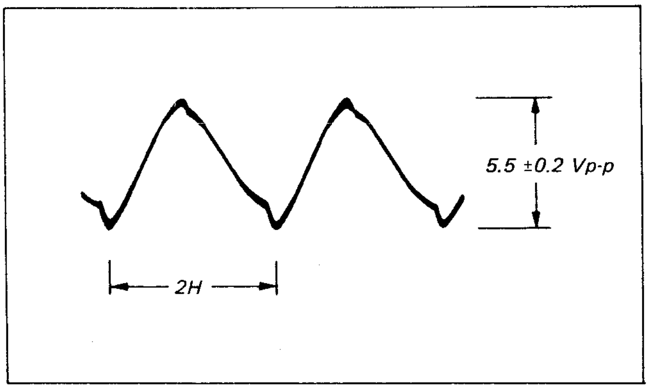


Fig. 5-33. SECAM ACK adjustment

3) Counter Bell Filter Adjustment (VT-1 Board)
Mode: Self-recording and playback
Signal: SECAM colour-bar
Adjust while observing the monitor TV screen.

[Adjustment method]

i) Record SECAM colour-bar signals.

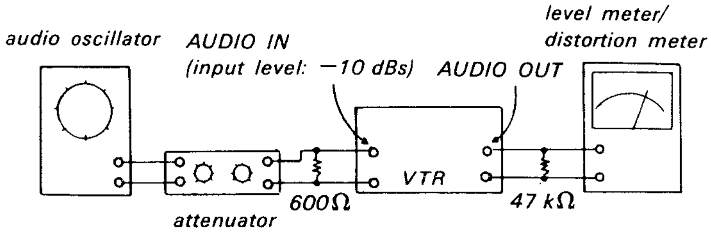
ii) Playback the recorded signals.

iii) While observing the monitor TV screen, adjust LV301 until the border between the red and blue areas is at its cleanest (minimum beats).

5-5. AUDIO SYSTEM ADJUSTMENT (SA-13 Board)

Use a Dynamicron tape for adjustments.

[Connection of Related Equipment]



[Adjustment method]

1. ACE head adjustment... See "Mechanical Adjustment"
2. Playback frequency characteristic check
3. Playback output level check
4. Bias oscillator adjustment
5. E-E level check
6. Record bias adjustment
7. Record level check
8. Overall frequency characteristic check
9. Overall S/N check
10. Overall distortion check

1. ACE Head Adjustment

Refer to "Mechanical Adjustment"

2. Playback Frequency Characteristic Check

(1) Play back 333 Hz and 5 kHz from the alignment tape and check that the level difference between 333 Hz and 5 kHz is within 0 dB ± 1 dB.

3. Playback Output Level Check

(1) Play back 333 Hz from the alignment tape and check that the output level is −30 dBs ± 2.5 dB.

4. Bias Oscillator adjustment

(1) Set the input signal level to zero (install a shorting plug to AUDIO IN jack) and set up the RECORD mode.

(2) Connect a frequency counter to Base of Q703 and adjust so that the frequency is 65 kHz ± 5 kHz with T701.

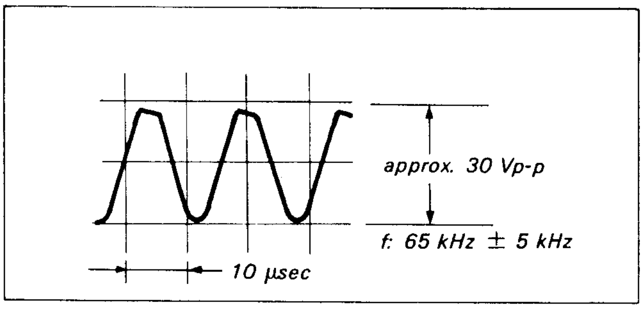


Fig. 5-27. Bias oscillator adjustment

5. E-E Level Check

(1) Supply a 333 Hz signal at −10 dBs.

(2) Set up the E-E mode.

(3) Check that the output level is −10 dBs ± 2 dB.

6. Record Bias Adjustment

Check that "Playback frequency characteristic check" has been made.

(1) Connect Pin ⑮ of IC701 and GND with a jumper wire so as to turn off the AGC operation.

(2) Supply a 333 Hz signal.

(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −30 dBs.

(4) Record signals.

(5) Supply a frequency of 7 kHz and perform Steps (3) and (4) above.

(6) Play back the recorded section of the tape and check that the output level at 7 kHz is ± 1 dB relative to the output level at 333 Hz. If the level is outside this range, repeat Steps (2) through (5) adjusting with RV702 until the standard is met.

(7) Remove the jumper wire after making the adjustment.

7. Record Level Check

(1) Connect Pin ⑮ of IC701 and GND with a jumper wire so as to turn off the AGC operation.
(2) Supply a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −10 dBs.
(4) Record signals.
(5) Play back the recorded section of the tape and check that the output level is −10 dBs ± 2.5 dB.

8. Overall Frequency Characteristic Check

(1) Connect Pin ⑯ of IC701 and GND with a jumper wire so as to turn off the AGC operation.
(2) Connect a 333 Hz signal.
(3) Set up the E-E mode and adjust the oscillator output level so that the level meter reading is −30 dBs.
(4) Record signals.
(5) Change the frequency to 50 Hz, 100 Hz, 7 kHz and 10 kHz and repeat Steps (3) and (4).
(6) Play back the recorded section of the tape and verify that the level is within the specification.

Standard values: With reference to the 333 Hz playback output level.

50 Hz $^{+2.5}_{-10}$ dB

100 Hz $^{+2.5}_{-3}$ dB

7 kHz $^{+2.5}_{-2.5}$ dB

10 kHz $^{+2.5}_{-10}$ dB

(7) If the specified values cannot be attained, perform 6 again. "Record Bias Adjustment".
(8) Remove the jumper wire after making the adjustment.

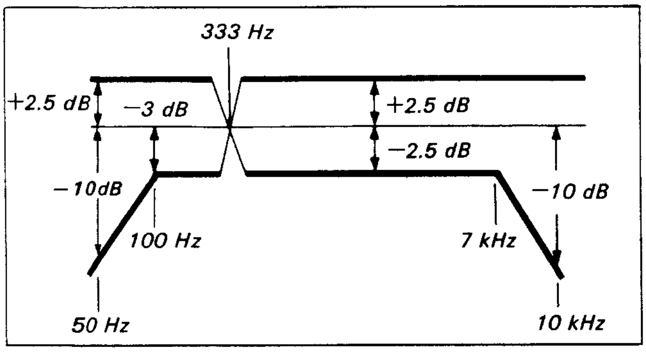


Fig. 5-28. Overall frequency characteristic

9. Overall S/N Check

(1) Supply a 333 Hz signal at −10 dBs.
(2) Record signals.
(3) Set the input signal level to zero (install a shorting plug to AUDIO IN jack) and record signals.
(4) Play back the recorded section of the tape and check that the output level difference is greater than 38 dB.

10. Overall Distortion Check

(1) Supply a 333 Hz signal at −10 dBs.
(2) Record signals.
(3) Play back the recorded section of the tape and verify that the distortion is below 4%.

5-6. TUNER SYSTEM ADJUSTMENT (VT-1 Board)

1) Tuner AGC Adjustment

(1) Set the DX/LOCAL switch on the rear panel to DX.
(2) Input RF signals (VHF channel, 61 dB μ/75Ω open) from a colour bar generator, etc.
(3) Connect a digital voltmeter to Pin ④ of IC701.
(4) Adjust RV701 to 6.7 Vdc ± 0.2 Vdc.

2) AFT Adjustment

(1) Set the AFT switch to OFF.
(2) Input RF signals, and adjust PRESET VR finely for the best picture quality, while watching the monitor screen.
(3) Set the AFT switch to ON.
(4) Adjust T703 finely for the best picture quality.
(5) Receive each channel and check to make sure that there is no beat or picture disturbance.

5-7. TIMER SYSTEM ADJUSTMENT (TT-13 Board)

1) Clock Adjustment

(1) Connect a time interval counter to Pin ⑥ of IC501.
(2) Adjust to 15624.85 μsec ± 0.05 μsec with CT501.

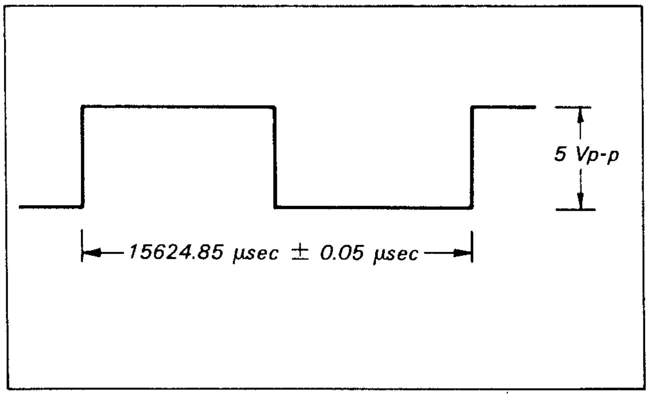
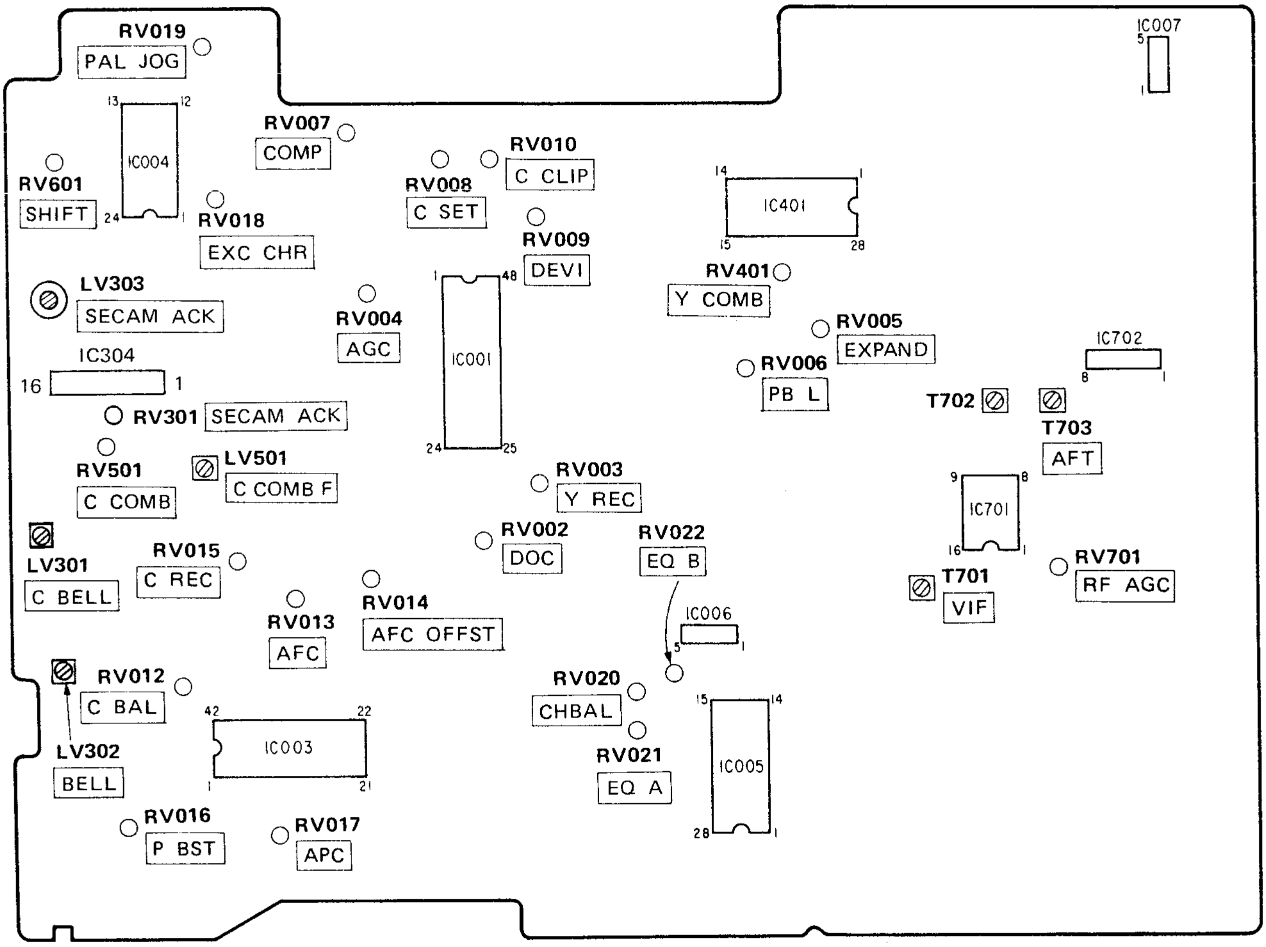
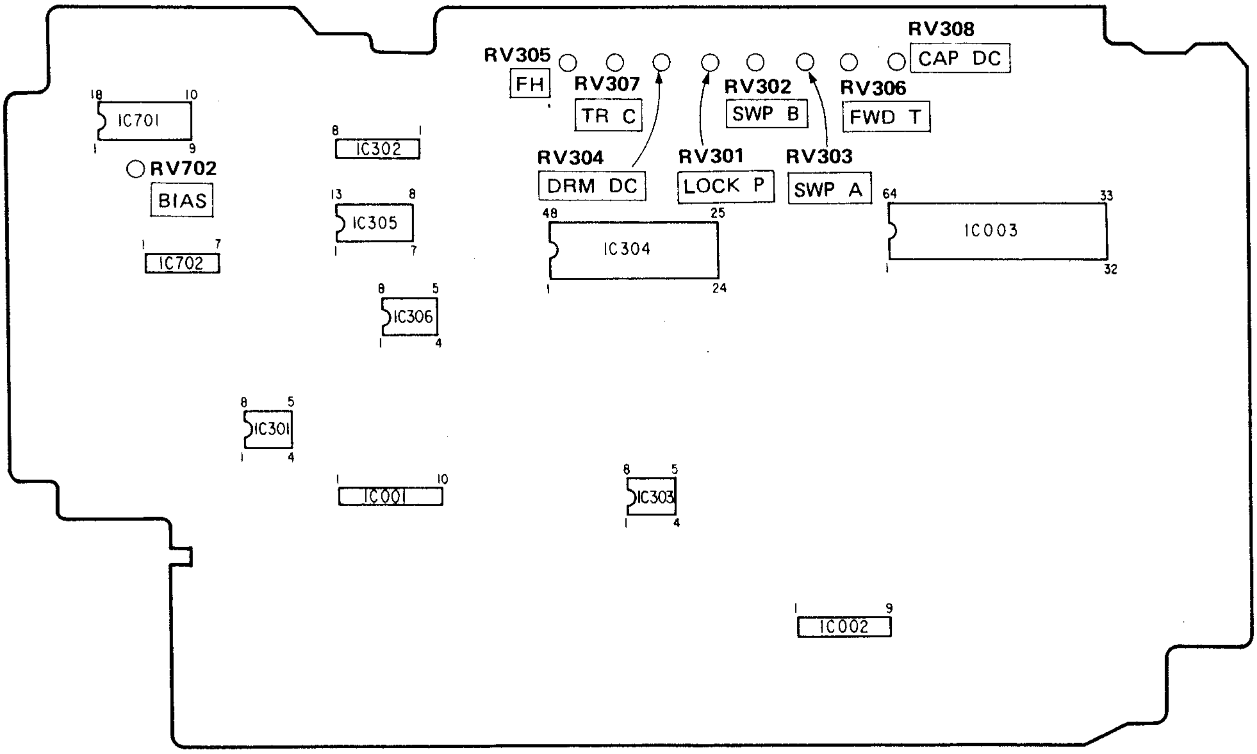


Fig. 5-29. Clock adjustment

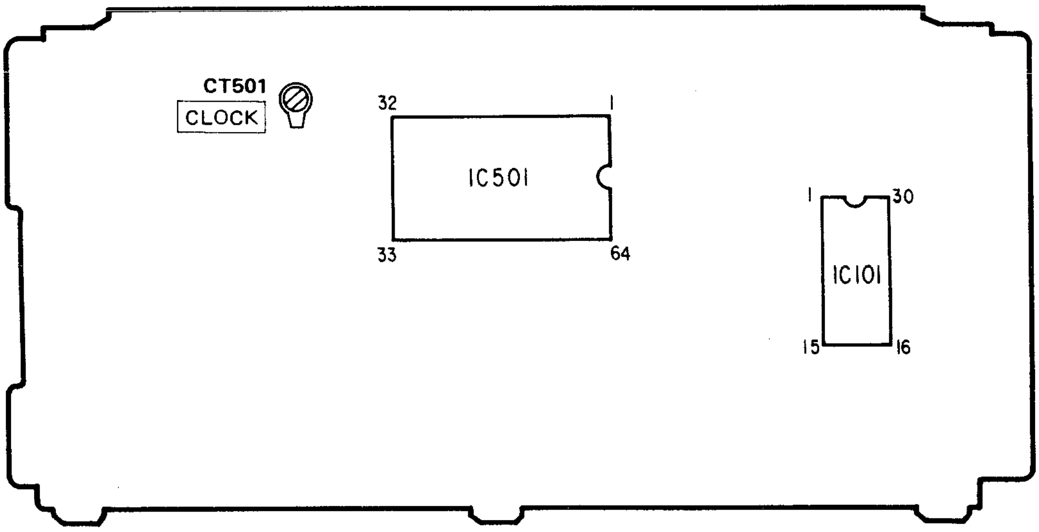
VT-1 BOARD (Component side)


RV019
PAL JOG
IC007
13
12
IC004
24
1
RV007
COMP
RV601
SHIFT
RV018
EXC CHR
RV008
C SET
RV010
C CLIP
RV009
DEVI
14
1
IC401
15
28
LV303
SECAM ACK
RV004
AGC
1
48
IC001
24
25
RV401
Y COMB
RV005
EXPAND
IC304
16
1
RV006
PB L
IC702
8
1
RV301
SECAM ACK
T702
T703
AFT
RV501
C COMB
LV501
C COMB F
RV003
Y REC
9
8
IC701
16
1
LV301
C BELL
RV015
C REC
RV002
DOC
RV022
EQ B
RV701
RF AGC
T701
VIF
RV013
AFC
RV014
AFC OFFST
IC006
5
1
RV012
C BAL
42
22
IC003
1
21
RV020
CHBAL
15
14
IC005
28
1
RV021
EQ A
LV302
BELL
RV016
P BST
RV017
APC

SA-13 BOARD (Component side)

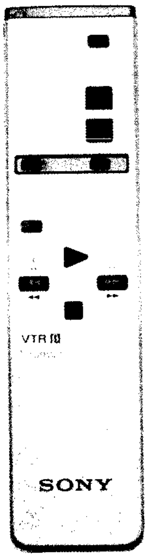

RV308
CAP DC
RV305
FH
RV307
TR C
RV302
SWP B
RV306
FWD T
18
10
IC701
1
9
8
1
IC302
RV702
BIAS
RV304
DRM DC
RV301
LOCK P
RV303
SWP A
13
8
IC305
1
7
48
25
IC304
1
24
64
33
IC003
1
32
1
7
IC702
8
5
IC306
1
4
8
5
IC301
1
4
1
10
IC001
8
5
IC303
1
4
1
9
IC002

TT-13 BOARD (Component side)


CT501
CLOCK
32
1
IC501
33
64
1
30
IC101
15
16

RMT-226

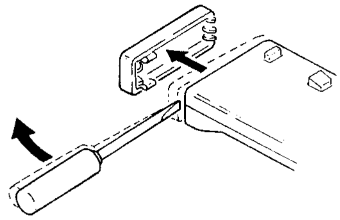
SERVICE MANUAL



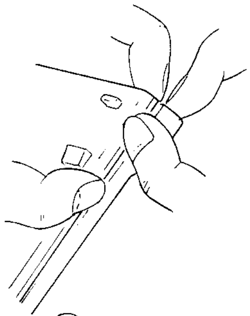
SPECIFICATIONS

Remote Commander RMT-226

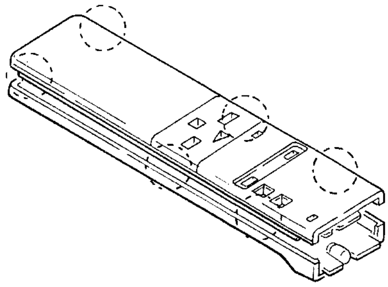
Remote control system	Infrared control
Power requirements	3 V dc, two IEC designation R6 batteries (size AA)
Dimensions	Approx. 44 × 20 × 17.5 mm (w/h/d) ($1^{3}/_{4} \times {}^{13}/_{16} \times 7$ inches) incl. projecting parts and controls
Weight	Approx. 110 g (4 oz) incl. batteries



① Remove the front panel by prying up with a screwdriver.



② While pulling the lower case outward, lift the upper case and free the claw.



③ Free all 6 claws similarly.

REMOTE COMMANDER

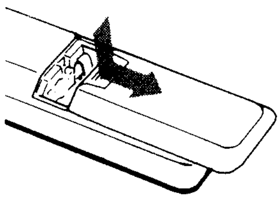
SONY®

1. REMOTE CONTROL OPERATION

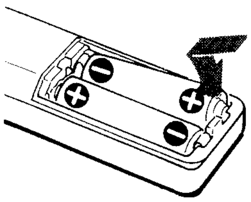
You can control almost all the functions of this video cassette recorder from your armchair using the supplied Remote Commander.

BATTERY INSERTION

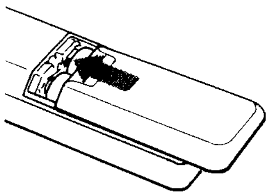
1 Open the lid.



2 Insert two IEC designation R6 batteries with correct polarity.



3 Close the lid firmly.

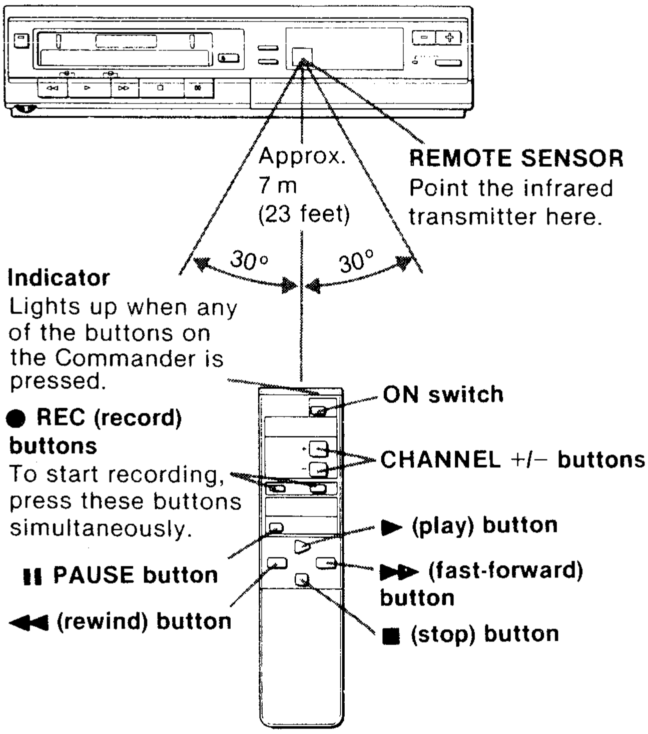


Battery life
In normal operation, batteries will last for about six months. If the range of the Remote Commander becomes noticeably short, replace the batteries with new ones. When the batteries are exhausted, the remote function indicator will not light when the buttons on the Commander are pressed.

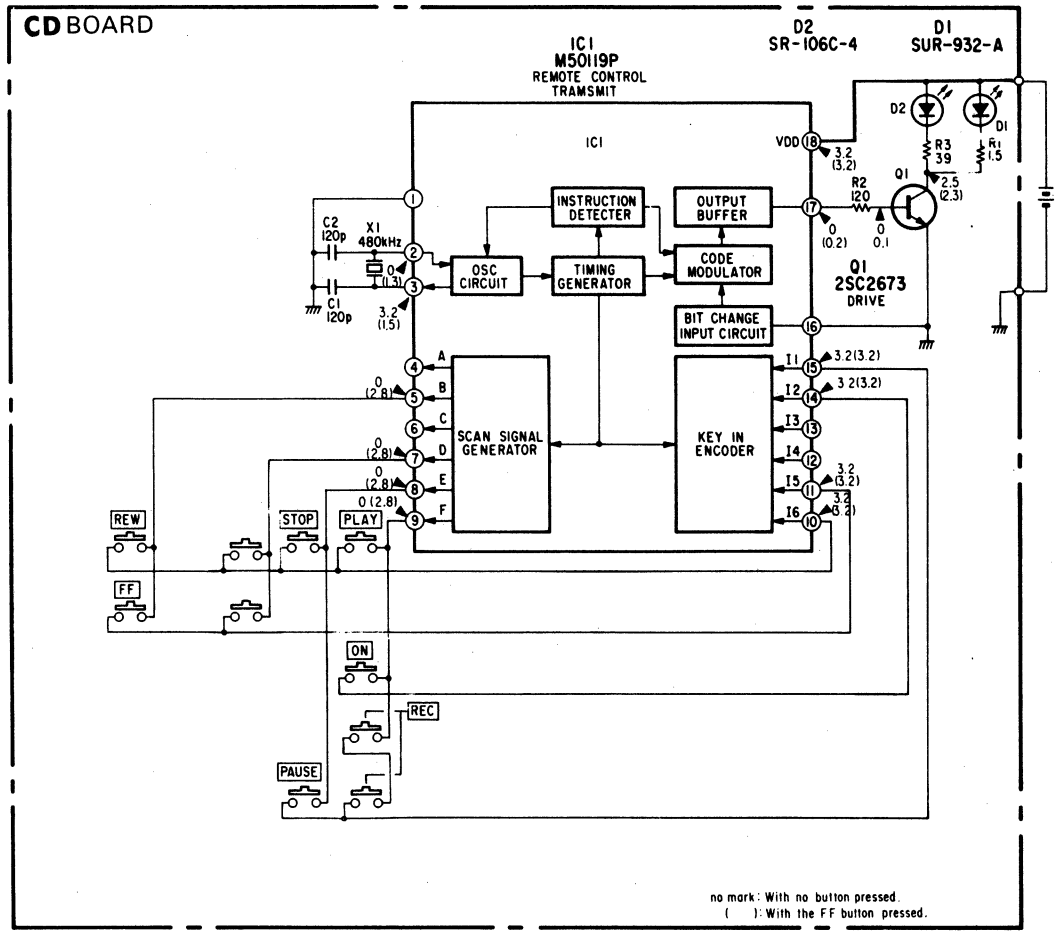
If the Commander is not to be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

Notes
- There should be no obstacles between the Commander and the REMOTE SENSOR of the recorder.
- The shorter the distance between the Commander and the recorder, the wider the angle within which the recorder can be controlled.

OPERATION


Approx.
7 m
(23 feet)
REMOTE SENSOR
Point the infrared transmitter here.
30°
30°
Indicator
Lights up when any of the buttons on the Commander is pressed.
ON switch
● REC (record) buttons
To start recording, press these buttons simultaneously.
CHANNEL +/– buttons
▶ (play) button
❙❙ PAUSE button
▶▶ (fast-forward) button
◀◀ (rewind) button
■ (stop) button

2. SCHEMATIC DIAGRAM



CD BOARD
IC1
M50119P
REMOTE CONTROL
TRANSMIT
D2
SR-106C-4
D1
SUR-932-A
VDD
R3
39
R1
1.5
R2
120
Q1
2SC2673
DRIVE
BATTERY
SIZE "AA"
(IEC DESIGNATION)
R6
2PCS 3V
C2
120p
X1
480kHz
C1
120p
INSTRUCTION DETECTER
OUTPUT BUFFER
OSC CIRCUIT
TIMING GENERATOR
CODE MODULATOR
BIT CHANGE INPUT CIRCUIT
SCAN SIGNAL GENERATOR
KEY IN ENCODER
REW
STOP
PLAY
FF
ON
REC
PAUSE

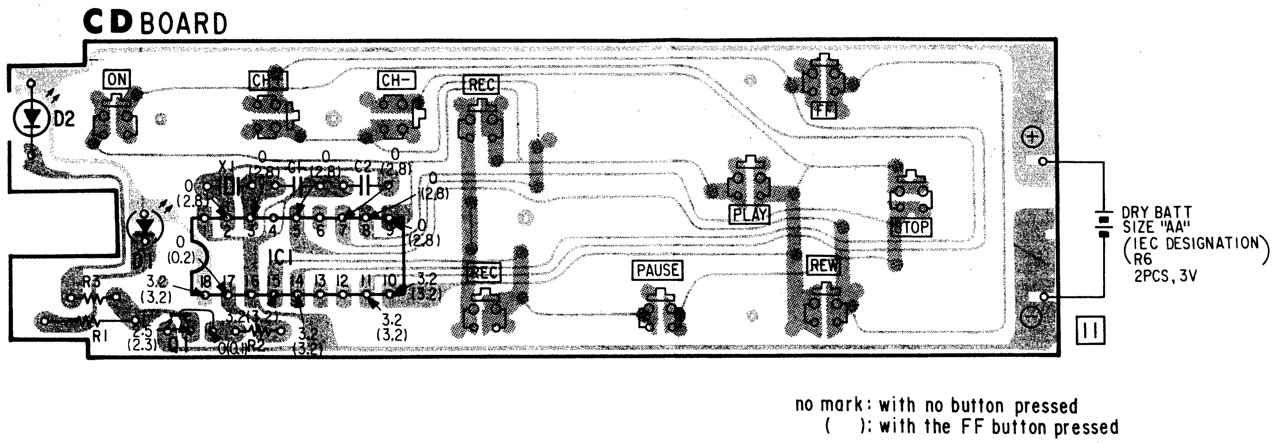
no mark: With no button pressed.
( ): With the FF button pressed.

Note:

- All resistors are in ohms, 1/6W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- ——— : B+ bus.
- The voltage value is measured using a digital tester (10MΩ).

When indicating parts by reference number, please include the board name.

3. PRINTED WIRING BOARD



CD BOARD
D2
ON
CH+
CH-
REC
FF
PLAY
STOP
PAUSE
REW
IC1
X1
C1
C2
R1
R2
R3
DRY BATT
SIZE "AA"
(IEC DESIGNATION)
R6
2PCS, 3V

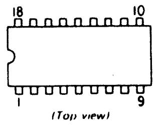
no mark: with no button pressed
( ): with the FF button pressed

Note:

- ○— : indicates a lead wire mounted on the component side.
- ▨ : soldering side
- ░ : B+ pattern.
- ▒ : Carbon pattern.

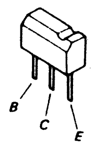
SEMICONDUCTORS

M50119P

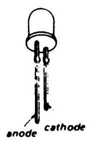


18
10
1
9
(Top view)

2SC2673

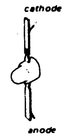


SLR932A



anode
cathode

SR106C-4

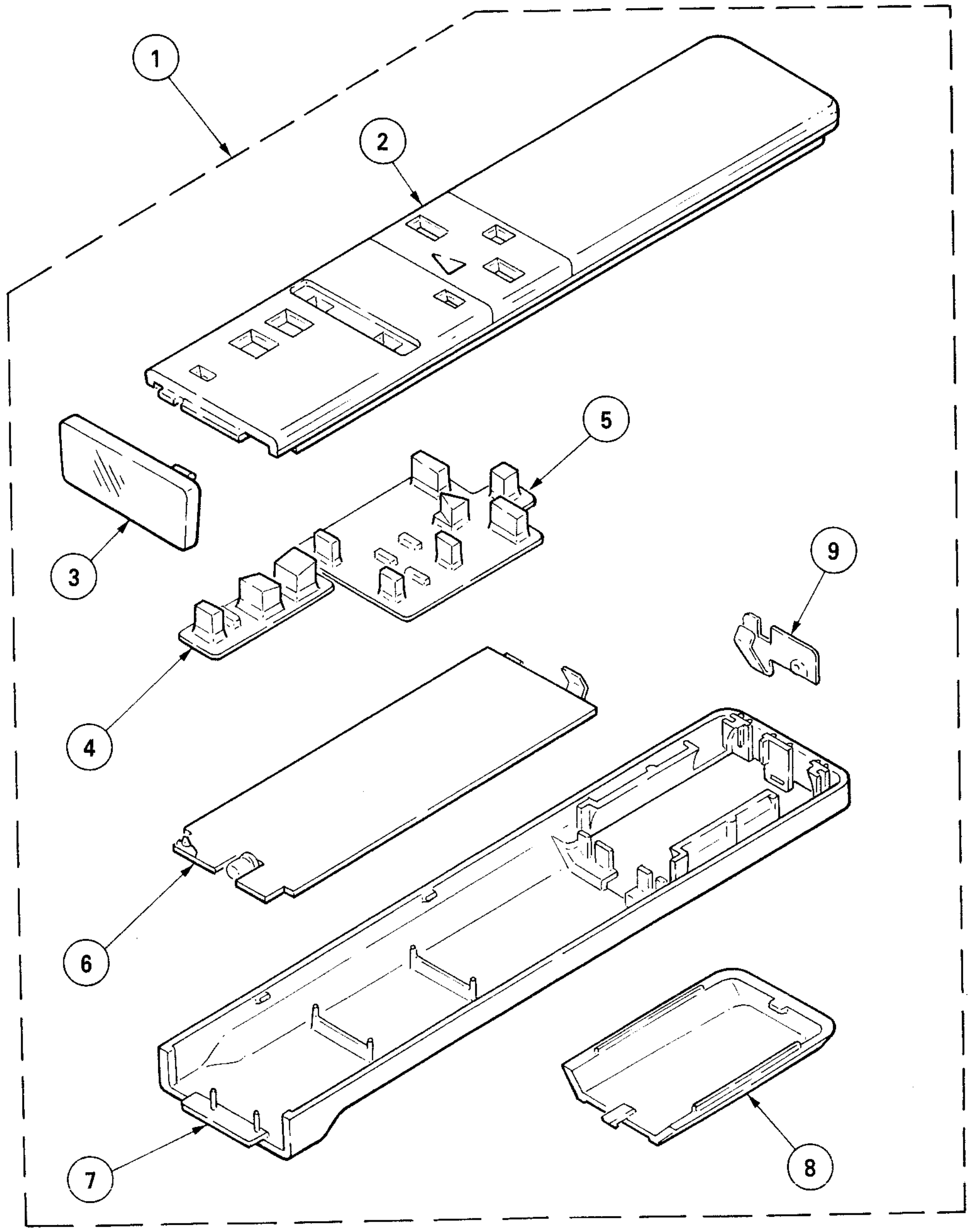


cathode
anode

4. EXPLODED VIEW

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.



No.	Part No.	Description	Remark
1	A-6765-920-A	COMMANDER ASSY (SILVER)	
	A-6765-921-A	COMMANDER ASSY (GRAY)	
	A-6767-079-A	COMMANDER ASSY (BLACK)	
	A-6767-414-A	COMMANDER ASSY (RED)	
2	X-2357-207-2	CASE ASSY, UPPER (SILVER)	
	X-2357-208-2	CASE ASSY, UPPER (GRAY)	
	X-2357-217-1	CASE ASSY, UPPER (BLACK)	
	X-2357-250-1	CASE ASSY, UPPER (RED)	

No.	Part No.	Description	Remark
3	2-357-208-01	PANEL, FRONT, COMMANDER	
4	2-357-209-01	RUBBER (A), CONTACT	
5	2-357-210-01	RUBBER (B), CONTACT	
6	*1-616-330-11	CD BOARD	
7	2-357-207-01	CASE, LOWER	
8	2-387-105-11	COVER, BATTERY	

5. ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description				Remark
	*1-616-330-11	CD BOARD *********				
	2-357-201-01	TERMINAL (A), BATTERY				
	2-357-202-01	TERMINAL (B), BATTERY				
		CAPACITOR				
C001	1-102-107-00	CERAMIC	120PF	10%	50V	
C002	1-102-107-00	CERAMIC	120PF	10%	50V	
		DIODE				
D001	8-719-912-39	DIODE SLR-932A				
D002	8-719-100-06	DIODE SR106C				
		IC				
IC001	8-759-600-07	IC M50119P				
		TRANSISTOR				
Q001	8-729-967-32	TRANSISTOR 2SC2673-Q				
		RESISTOR				
R001	1-247-073-00	CARBON	1.5	5%	1/4W	
R002	1-247-809-00	CARBON	120	5%	1/6W	
R003	1-247-797-00	CARBON	39	5%	1/6W	
		CRYSTAL				
X001	1-527-476-00	OSCILLATOR, CERAMIC				

****